A TREATISE

ON THE

CURE OF ULCERS BY FUMIGATION:

IN WHICH A RATIONAL TREATMENT IS DEDUCED FROM THE

PHYSIOLOGY OF ULCERATION,

AND PROOFS AFFORDED THAT

THE NEW METHOD

PRODUCES

MORE SPEEDY, CERTAIN, AND PERMANENT EFFECTS,

THAN ANY OTHER IN GENERAL USE.

WITH AN ANALYSIS OF THE MODES OF CURE HITHERTO EMPLOYED, AND AN EXPOSITION OF THE DECIDED ADVANTAGES POSSESSED BY THE NEW TREATMENT.

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PREFACE.

On the publication of a work, custom has rendered it incumbent on the Author to declare the reasons which have induced him to appear before the public. Amongst these reasons, the least objectionable, perhaps, is the announcement of some new fact, especially when that fact is intimately connected with the advancement of medical science, and the cure of disease.

Influenced by moral as well as by physical instincts, we are all more or less inclined to look with favour on anything resembling a discovery which may emanate from ourselves. It is a feeling inseparable from the zealous pursuit of knowledge, and will, I trust, be accepted as my excuse, if, in the following pages, I may seem to have overrated the value of medicated fumigation in the cure of habitual ulcer of the legs.

The history of Medicine abundantly proves that we have made little progress towards the radical and permanent cure of ulcer since the earliest periods of the healing art. With the exception of the advance made by the introduction of pressure and support, as principles of treatment, we cannot point out a single improvement of any importance since the days of Hippocrates and Galen. In modern, as in olden times, we endeavour to cure ulcers with unguents, plasters, or lotions, for the purpose of exciting the growth of granulations. These unhealthy growths, the product of an artificial stimulus, and springing from an ill-conditioned soil, are imperfect means of reparation, unmanageable, and the source of constant disappointment to the baffled practitioner.

Another cause of the want of success which has hitherto attended the ordinary treatment of inveterate ulcer, arises, as I have endeavoured to show, from want of due attention to the state of the afflicted limb. Either from previous disease, or

in consequence of the irritation kept up by long-continued ulceration, the tissues in the neighbourhood of the ulcerated part are extensively disorganised; their vitality and structure are at once seriously impaired. Hence the difficulty of effecting even a temporary cure, and the still greater difficulty of rendering that cure permanent: hence the chief reasons why the regular practitioner is so often disappointed, and patients fly from the imperfect resources of science to the delusive promises of the impostor.

By the mode of treatment which I now introduce to the notice of the Profession, we get rid of the impediments to which I have just alluded; we dispense, for the most part, with the growth of granulations, thus facilitating cicatrisation; and we essentially improve the vital and structural conditions of the affected limb, thus rendering the cure more permanent.

From much experience of the power possessed by the sulphur and iodine fumigation, I am

convinced that it will be found an invaluable agent in the treatment of many other affections as well as ulcer. Whenever the objects of the surgeon are to stimulate the vital properties of any diseased part—to promote rapid absorption of morbid products — to substitute interstitial growth for the imperfect reparative process which accompanies or follows inflammation—he cannot have recourse to more efficient means than fumigation. When judiciously employed, it will produce effects which no other mode of treatment that I am acquainted with is capable of inducing: it is simple, easy of application, and, like many simple agents, most powerful in operation: it is a new instrument added to the limited resources of our art; and, in earnestly recommending it to notice, I feel that I merely fulfil a duty which every medical man owes to the profession that he cultivates.

11 St. James's Place, St. James's,
Jan. 1847.

A

TREATISE ON ULCERS,

&c. &c.

CHAPTER I.

HISTORICAL SKETCH : HIPPOCRATES.—TREATMENT OF GALEN.—METHOD OF CELSUS.—BANESTER'S TREATMENT.—PARÉ AND HEISTER.—WISEMAN'S METHOD.—UNDERWOOD AND BAYNTON.—BAYNTON'S BANDAGE.—WHATLEY AND BELL.—SIR EVERARD HOME.—MODERN SURGEONS.—HIGGINBOTTOM'S METHOD.—ENGLISH, FRENCH, AND GERMAN SCHOOLS.—REMEDIES EMPLOYED AND ABANDONED.

THERE is no class of diseases to which a greater variety of remedial means has been, from time to time, applied than ulcers; yet, if we cast a glance over the history of the treatment of ulcers, we shall find that, from the days of Hippocrates down to the present period, but little progress has been made towards the attainment of any satisfactory method of cure. Indeed, if we except the principle of compression, first introduced by Wiseman, and subsequently adopted by Theden, Underwood, Baynton, Bell, &c., the treatment of habitual ulcers of the legs has remained nearly the same as it has been handed down to us from the father of medicine. A rapid view of the opinions and practice of various surgeons will at once show this to be the case.

Hippocrates devotes a special chapter* to the history and treatment of ulcers, a class of diseases to which he seems to have attached much importance. After having briefly noticed the different forms of ulcer, their causes, &c., he alludes to the influence of posture in the treatment, and expressly forbids standing or walking in cases of ulcers of the legs; even the sitting posture he condemns, and enjoins absolute rest. As a general principle, he does not approve of cataplasms, oils, or other unctuous or greasy dressings. His treatment is extremely simple. The ulcer is first to be well cleaned with soft lint; whatever remedy the surgeon may select is then to be applied over its surface, and covered carefully with pledgets of dry lint, the whole being supported by a proper bandage. The remedies employed consist of a great variety of plants, &c., coming under the class of astringents and stimulants. Such is the treatment of what we would call "a healthy ulcer." In all other forms, the surgeon must direct his attention to the complication, and endeavour to remove it. Thus, in cases of inflamed ulcer, the inflammation must be allayed by diet and general means, seconded by poultices of marsh mallows or bruised linseed: when the inflammation is removed, the cure may be effected by gentle stimulants which promote cicatrisation, such as the leaves of the six day rose, wine, or a solution of alum in vinegar. When the healing of the ulcer is prevented by luxuriant granula-

* Περι των ελκων.

tions or proud flesh, these are to be removed by the knife or by caustics, and the ulcer then healed by bandaging or pressure. Whether Hippocrates employed the word pressure in the sense which modern surgeons give to it, in relation to the treatment of ulcers, I have not been able to ascertain. Inveterate ulcers are mostly seated in front of the tibia, and for these he recommends powerful stimulants, with cataplasms composed of the flowers of meliolotus and the powdered roots of the wild myrtle.

Galen * has handed down to us a most complete and careful treatise on ulcers, of which I can only give a very scanty abstract. He tells us to consider well the temperament of the individual, and of the part of the body with which we have to deal, because the temperament of the patient extends to and is reflected by the diseased part. The surgeon's first care must be to remove any complication which may exist, whether it be inflammation, erysipelas, gangrene, &c., or any other, be it simple or complex, "for," remarks this illustrious author, "unless the complications be removed, how can we cure the ulcer? We must, then, reduce the surface of the ulcer to as healthy a state as possible, before we try to heal it; for the new flesh to heal the sore, must come from healthy flesh under it; but from inflamed and ill-conditioned or diseased flesh, new flesh cannot be generated." What a curious foreshadowing was

* Paris Edition, xiii. vols., 1639; vide vol. x. Method. Medend., lib. iii.; also vol. xiii. De Compos. Medica per Genera, lib. iv.

this of the doctrine promulgated seventeen centuries afterwards by the late Professor Macartney !

Galen distinguishes clearly constitutional from local ulcers. "Some are alone, neither preceded nor followed by any other affection;" while many depend on the habit of the body. He then treats of ulcers which are ill-conditioned, either from the evil nature of the flesh, or the influx of humours.

The mode of treatment must be varied according to the several indications. If the surface of the ulcer be foul and dry, fomentations of warm water are to be employed; if the discharge be too profuse, then astringents are indicated. When the edges of the ulcer are discoloured and callous, they are to be removed with the knife down to the sound flesh; sores of this description he regards as generally constitutional, and demanding rather general than local treatment. In speaking of old or habitual ulcers, he contends that the duration of the sore indicates *per se* a constitutional affection.

The sum of Galen's doctrine is, that all ulcers require, in the first instance, stimulant remedies; and when the discharge has been modified, then astringents to promote cicatrisation. Proud flesh is to be destroyed by caustics, and every complication to be attacked according to its nature. The stimulants which he recommends for old and bad ulcers are burned ærugo, alum, burned lead, scales of iron or brass, and an endless variety of vegetable compounds. The mode

of dressing is precisely the same as that recommended by Hippocrates; he adds, however, that when a bandage is used, "it should be applied from the inferior point of the affected limb up to the ulcer, as Hippocrates advises for fractured bones," an advice which seems to indicate that he was aware of the benefit derived from support, if not from pressure. Galen does not neglect constitutional treatment in all cases where the habit of body indicates a general derangement of the health. When the latter is removed and the ulcer cleaned, he applies mild astringents. When the sore is complicated with varix, the varicose vein must first be excised; and the callous edges of certain ulcers may be destroyed by caustics, as the litrum torrifactum, unslacked lime, ærugo, or the spuma argenti.

From the Greek writers we pass through a long series of copyists to Celsus, but the Roman author is infinitely inferior in every respect to his illustrious predecessor, from whom he seems to have borrowed the greater part of his medical lore. The callous ulcer, he says, generally occurs on the legs and feet; it is very difficult of cure, and the cicatrix is apt to give way. For its cure he recommends a cerate composed of the scales of brass, burned lead, cadmia, wax, and roses *quantum suff.* Celsus dismisses the subject of old ulcers very briefly. He tells us to refresh the surface with the knife, and cut away the edges in order to reduce it to the state of a fresh wound; this done, the sore is to be treated in the usual way of a common wound. If unwilling

to use the knife, we may destroy the surface of the ulcer with any caustic plaster, and then employ various stimulants to promote cicatrisation.

Having thus briefly alluded to the opinions of the ancients, I proceed to the analysis of the works of some of the earlier English and French writers on the subject of ulcers; their doctrines, it may be here observed, are more or less derived from the Greek authors.

Banester, * in his surgical works, devotes a long chapter to ulcers, but the essential points of his practice may be told in a few words. Painful ulcers are to be treated with poultices containing either anodynes or narcotics. Ulcers with "flesh excreasing" (proud flesh), require the "cauterie actual or corrosive powders." In cases of callous ulcer, we are to employ resolutive applications; or if the sore be obstinate, then scarify the edges, and have recourse to mercurial dressings. In the therapeutical portion of his work, however, Banester mentions a mode of treatment which he says he invented himself, and which I am tempted to describe in his own words. The remedy is entitled "*A fume, to be used in ulcers of the inferior parts or feet in moyst bodies, and such as be subject to putrification, by reason whereof the ulcers oft become rebellious and hard to be cured, wherefore this fume (after the bodie is purged and the ulcer mundified) is very commodious to be used.*

* The works of that famous chirurgeon, Mr. John Banester, by him digested into five books. London, 1633.

℞. Styracis liquidi, three ounces;
Masticis, one ounce;
Mirrhæ, three dragmes;
Gariofilorum, half an ounce;
Terebinthinæ, half an ounce;
Sandracæ, one dragme;
Baccis lauri, half a dragme;
Cinabrii, two ounces.

Pulverizentur pulverizanda; then mix, and make it according to art.

The True Use thereof.

Prepare a coffer for the purpose, made of pine-tree, both ends made to open and shut closely, having in the middest a proper noke or place for the legge to lye in at, and in the inner part of the other side of the coffer, a rest for the heele; then place in either end of the chest a chafing-dish of coals, laying on the coals some of the fume, and the feet being duly placed, boulster the same in close that no smoke come forth. So let the patients continue the space of time according to their strength, viz., one hour or more, and every third day use this so long as need shall require."

This curious paragraph affords the first trace which I have been able to find of the employment of fumigation as a means of curing ulcers. It is hardly necessary to add that I was not aware of its existence until very recently, when making researches to complete this historical sketch.

The works of Ambrose Paré, Heister, and Wiseman, furnish a fair idea of the opinions entertained by the French, German, and English practitioners, at the period of the revival of modern surgery.

Paré * follows the ancients closely in his description of ulcers, and in the treatment which he recommends. The main object of the surgeon must be to reduce the sore to a simple state; this done, he must employ remedies tending to the generation of flesh, and then use those which promote cicatrisation. These latter are, chiefly, burned alum and vitriol reduced to powder, and thinly strewed over the surface of the ulcer; or the root of aristolochia, aloes, burned lead, pomegranate pills, lutea, burned litharge, and also plates of lead, besmeared with quicksilver, and bound down over the sore.

The remedies must be varied according to the nature of the ulcer. In ulcers characterised by pain, narcotic applications, or henbane, hemlock, nightshade, and the seeds or oil of poppies, are recommended. When the pain is excessive, a pledget of lint dipped in strong Ægyptiacum, or oil of vitriol, is to be applied. In cases of ulcer with redundant granulations, astringents, causties, or the actual cautery, are required. In the treatment of foul ulcers, he conforms to the principles laid down by Galen.

Heister's † remarks on ulcers are not very complete, or distinguished by any attempt at original views. For common ulcers he employs digestives and cicatrising remedies. In cases of callous ulcer, the hard edges are to be removed by causties, or the whole surface may be removed by the

* Œuvres Complètes d'Ambroise Paré. Paris, 1561.

† Chirurgie. Nuremberg, 1718.

knife, or by the actual cautery (according to Severinus). Heister speaks well of Le Dran's method in cases of this kind. Le Dran applied a strong mercurial plaster for four or five days over the surface of the sore, until the callous parts became soft; he then made numerous incisions through the moistened edges, and finally re-applied the plaster.

Heister has a chapter especially devoted to obstinate ulcers of the legs, but he is of opinion that in no case is it proper to heal them up completely. Sometimes, when a sore which we desire to cure will not cicatrise, it is necessary to give mercury by the mouth; this will often cause it to heal, though it be not venereal.

Wiseman * differs but little from Ambroise Paré in his account of ulcers. In speaking of callous sores, he remarks that the ulcer must cicatrise from the edges towards the centre; hence, we first endeavour to soften the edges by emollient or discutient remedies; should these fail, we may try a plate of lead, rubbed with mercury, and supported by a good compress and bandage; in cases where pressure cannot be applied, we must remove the callous edges with the knife.

The chief merit, however, of Wiseman consists in his being the first who understood and recommended the use of methodic compression in the treatment of old ulcers of the legs. He speaks highly of the "laced stocking," as a means of pressure, which he introduced into practice for

* Several Chirurgical Treatises, &c. London, 1692.

varicose ulcers. Wiseman recommends either the real or palliative eure. The former consists in taking up the varicose veins; the latter, or palliative, in the use of the laeed stoeking, with digestive or detersive remedies.

For other species of ulcers, he employs a variety of plasters and ointments, according to the views entertained at his time.

From the days of Wiseman down to the present period, the attention of English surgeons has been constantly directed to the treatment of ulcers of the legs, and a great number of works have been written specially on the subjeet. These I shall notiee briefly in suecession.

Mr. Underwood, in 1783, produced a very sensible treatise on ulcers.* In eontradistinction of most of his predecessors, he strongly reeommended exercise during the period of treatment, with flannel bandages and various active remedies, as red preeipitate, nitrate of silver lotion, &c.

Mr. Baynton, in 1797,† published his well-known method, which consists in the use of strips of adhesive plaster applied with the object of bringing the edges of the sore together, and thus producing a more firm cicatrix.

"The parts," says Mr. Baynton, "should be first cleared of the hair, sometimes found in eonsiderable quantities on the legs, by means of a razor, that none of the discharges,

* A Treatise upon Ulcers of the Legs, &c. London, 1783.

† Descriptive Account of a new method of Treating Ulcers. London. 1797.

by being retained, may become acrid and inflame the skin, and that the dressings may be removed with ease. The middle of the piece so prepared (that is, adhesive plaster, cut into strips about two inches in breadth, and of a length that will, after being passed round the limb, leave an end of about four or five inches) is to be applied to the sound part of the ulcer, so that the lower edge of the plaster may be placed about an inch below the lower edge of the sore, and the ends drawn over the ulcer with as much gradual extension as the patient can well bear. Other slips are to be secured in the same way, each above and in contact with the other, until the whole surface of the sore and the limb are completely covered, at least one inch below and two or three above the diseased part. The whole of the leg should then be equally defended with pieces of soft calico, three or four times doubled, and a bandage of the same about three inches in breadth and four or five yards in length; or, rather, as much as will be sufficient to support the limb from the toes to the knee, should be applied as smoothly as can possibly be performed by the surgeon, and with as much firmness as can be borne by the patient."

Mr. Baynton directs the bandage to be carried from the toes to the knee, and recommends the constant use of cold water (every hour) whenever the parts are much inflamed, or the discharge very profuse.

Mr. Baynton attributed the success which attended this method of treatment, to his bringing the edges of the ulcer

as near together as possible, and thus diminishing the size of the cicatrix; but it seems more rational to conclude that it mainly depended on the careful application of the bandage, by which the whole limb was subjected to as great a degree of pressure as the patient could bear.

He was soon followed by Mr. Whatley,* whose treatise differs very slightly from that of Underwood.

Mr. Whatley's method consisted in the use of pressure applied to the surface of the sore by means of compresses, and to the limb through a flannel roller. The patient he allowed, "from the first application of the bandage, freely to follow the most laborious employment, and to walk or stand the whole day." In some peculiar cases, he called to his aid the general principles of surgery, giving bark to delicate patients, destroying redundant growths by caustics, and promoting cicatrisation by various astringent or stimulant remedies. The methodic compression of the limb, as a main principle in the cure of ulcers, has been adopted (in addition to the authors just mentioned) by Theden, Desault, Else, Michaelis, Bücking, Richter, and Metzler; while Mr. Baynton's plan has been modified by Thomson, Fricke, Scott, P. Boyer, and many others.

To Mr. Benjamin Bell we owe the first complete English treatise on ulcers,† but a brief notice of his work will show

* Practical Observations on the Cure of Wounds and Ulcers on the Legs, without rest. London, 1799.

† A Treatise on the Theory and Management of Ulcers. Edinburgh, 1791.

how little advance had been made in the treatment of this affection since the days of Galen. Mr. Bell advocates the treatment of ulcers on general principles. He relies chiefly on compression, "which," he says, "proves so generally useful, that after the inflammatory stage is over, it ought, in perhaps every instance, to be employed. In simple ulcers he recommends various applications with a view of promoting cicatrisation, and enjoins rest and the horizontal position. In cases of vitiated ulcer, he first allays irritation by emollient fomentations, and then gives bark, &c., as a constitutional remedy. In this way he endeavours to reduce the sores to the state of a "simple purulent ulcer" (the idea of Celsus and Galen), and when the sore is obstinate, or of long standing, he inserts an issue to keep up a drain. The edges of callous ulcers should be destroyed by the nitrate of silver or caustics, until the surface of the sore is reduced to the state of a simple ulcer.

Sir Everard Home * distinguished ulcers into six forms. For the healthy ulcer, he recommended very simple dressing, as dry lint, cerate, &c., and a common bandage. In cases of old ulcer, pressure, with a weak solution of nitrate of silver, or powdered rhubarb, &c. For the irritable ulcer, soothing applications, in the form of vapour, or the carrot poultice, &c. In cases of indolent ulcer, rest, the bandage, or strips of plaster, and stimulant applications, as nitrate of

* Practical Observations on the Treatment of Ulcers on the Legs. London, 1796.

silver, nitrous acid, tincture of myrrh, &c. For specific ulcers, mercury, hemlock, salt water, nitrate of silver, and arsenic. Finally, for varicose ulcers, he revived the old method of taking up the saphena vein and applying a bandage.

Nitrate of silver was one of the earliest remedies employed in the treatment of ulcers, but it was generally used as a lotion. In 1829, Mr. Higginbottom, surgeon, of Nottingham, published his practical and well-known essay * on the use of nitrate of silver in the solid form.

The method recommended by Mr. Higginbottom is the following:—A bread-and-water poultice is first applied to the ulcer for eighteen or twenty-four hours, and the patient is ordered to take a dose of aperient medicine; the leg is then well washed with soap and water, and after being wiped dry, the inflamed part is moistened with pure water, and a stick of nitrate of silver is passed twice over it, and a little beyond on the healthy skin.

The same application is made more fully to every part of the ulcer, and the margin of surrounding skin. Some linen, thickly spread with a defensive plaster, is then placed over the ulcer, and the whole supported by a linen compress and light bandage. On the fourth day the dressings are to be removed, and the use of the caustic is to be renewed, according to circumstances, every third or fourth day, until

* An Essay on the Use of the Nitrate of Silver in the Cure of Inflammation, Wounds, and Ulcers. London, 1829.

the sore be healed. In some cases, Mr. Higginbottom assists the caustic, by strapping with plaster, after the method of Baynton or Scott.

Mr. Stafford * recommends a mode of treatment which consists in pouring into the cavity of the ulcer melted wax, of an extremely adhesive quality, and just at the temperature when it is on the point of cooling. It is composed of four parts of white wax and one of Venice turpentine. After it becomes perfectly solid in the ulcer, a strip or two of adhesive plaster may be applied over it. The sore should be dressed again on the third day.

Mr. Skey † speaks in very favourable terms of the constitutional treatment of ulcers with opium. He generally gives half a grain of the extract night and morning; but in old persons the dose may be carried, if necessary, to the extent of two grains, night and morning. This treatment, according to Mr. Skey, will be found most effective in cases of chronic ulcer in old persons inclined by habit for spirituous drinks; and in the leuco-phlegmatic who have not been similarly addicted.

The treatment adopted by Mr. Eccles, ‡ one of our most recent writers on the subject of ulcers, is simple and ra-

* An Essay on the Treatment of the Deep and Excavated Ulcer. London, 1829.

† A New Mode of Treatment employed in the Cure of Ulcer, &c. London, 1837.

‡ On the Nature and Treatment of Ulcers, particularly Ulcers of the Legs. London, 1838.

tional, although not very novel. For the inflamed ulcer he recommends absolute rest, an elevated position, cold lotions, and the local abstraction of blood. For chronic ulcers with varix, the sole cure is by bandaging. For the habitual ulcer, he advises astringent or stimulant lotions; or to remove induration, the local use of mercury and iodine.

In cases of constitutional sores, Mr. Eccles employs constitutional treatment, according to the presumed nature of the ulcers.

In 1838, Mr. Johnson published some judicious remarks on the "Treatment and Cure of Sore Leg, without Confinement;"* but his pamphlet contains nothing new. He follows Mr. Whatley's plan, merely substituting a calico or linen roller for the flannel one.

Mr. John Davis, of Hertford, strongly recommends the tincture of iodine† in all cases of sloughing, irritable, or spreading ulcers; the tincture (forty grains of iodine to the ounce of rectified spirit) is freely applied over the surface of the sore, and two or three inches of the surrounding skin. The ulcer is allowed to remain exposed for some time, and is then covered over with a poultice, or any simple ointment, or lint. The tincture is thus applied daily, until the ulcer becomes clean and healthy, when the strength of the tincture is reduced, and the granulations

* Treatment and Cure of Sore Leg, without Confinement. By Edward Johnson, Surgeon. London, 1838.

† Practical Remarks on the Use of Iodine, locally applied in various Surgical Disorders, &c. London, 1839.

touched with it every two or three days. Pressure may be applied whenever the seat of the ulcer will admit of it.

Mr. Maxfield's treatise* differs in nothing essential from the numerous works which preceded it on the utility of pressure. The method which he advocates "consists chiefly in the application of gentle and equable pressure to the whole cavity of the ulcer, assisted by simple dressings without any kind of greasy ingredient; and firm support of the affected leg, by means of a bandage applied from the toes to the knee."

M. Guyot† has recently published a remarkable treatise, to which I shall have occasion to refer again, on the use of warm air in the cure of ulcers, wounds, and several diseases. The warm air is generated by means of a spirit lamp, and conveyed through a tube to the affected part at a temperature of 95°, &c. The author relates many cases of obstinate ulcers, which were rapidly cured by this method.

In the *Archives Générales de Medécine*, for Oct. 1843, M. Conté,‡ setting out with the idea of the injurious action of air on exposed wounds, proposes to cover the surface of the ulcer with a thin plate of India rubber. The plate

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* Observations on Ulcers of the Legs and other parts, &c., by Archibald Maxfield. London, 1842.

† De l'emploi de la chaleur dans le traitement des ulcères, &c Paris, 1842.

‡ Recherches sur le traitement des ulcères des Jambes, par J. L. Conté. Labé, Paris, 1843.

must be larger than the ulcerated part by a few lines, and it is applied by gentle pressure of the warm hand, so as to mould it over the surface of the sore. It is then supported by strips of plaster and a roller, according to Baynton's method.

M. Gerdy* has lately noticed a simple method of employing the inclined plane. He places, near the bottom of the bed, a chair turned upside down, with the back inclined towards the pelvis of the patient. The limb is placed on a pillow which rests on this inclined plane, and is defended from the weight of the bed-clothes by hoops. The effect of position is, in many cases, sufficient to complete the cure without the aid of any remedy; but M. Gerdy occasionally uses strapping with diachylon plaster. To enumerate the immense number of remedies which have been successively employed and abandoned, in the cure of ulcers of the legs, would be at once tedious and unprofitable. Some of them, however, are worthy of a passing notice. The chief are fixed air, by Champeau, Pott, and White; gastric juice, by Carmianti, Sennibier, Home, and others; lead, by Goulard; creasote, by Reichenbach; decoction of hops, by Hammick; decoction of walnut-tree leaves, by Hunezowsky; strong solution of alum by Fallopius; preparations of copper, by the ancients; the chloride of lime, by Percy, Labarraque, and Lisfranc; the hunger-cure and cold lotions, by Rust.

* L'Experience, Juliett 11, 1844.

Having thus detailed the opinions entertained by the principal writers on ulcers, it remains to give a brief account of the practice recommended by standard writers of the present day. The treatment of the English, French, and German schools may be taken as fairly represented in the well-known works of Mr. Samuel Cooper, Messrs. Roche and Sanson, and Chelius. Mr. Cooper adopts the practice recommended by Sir E. Home, to which he adds the different modes of pressure successively recommended by Underwood, Baynton, and Scott.

Messrs. Roche and Sanson * inform us that modern surgery has rejected the innumerable variety of plasters, balsams, and lotions which abounded amongst the ancients. The chief means to be depended on are—rest in the horizontal position, simple local remedies according to the nature of the sore, and pressure. In old and extremely obstinate ulcers, they recommend cauterization with the hot iron, or the application of a large blister. Chelius† treats atonic or habitual ulcers exactly in the same manner as the one adopted in the French school—viz., by rest, simple local remedies, and bandaging. Whenever the constitution seems deranged, general means are to be had recourse to.

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* Nouv. Elem. de Pathologie, Paris, 1832.

† Handbuch der Chirurgie. Heidelberg, 1826.

CHAPTER II.

ULCERATION. — GRANULATION. — CICATRISATION. — INTERSTITIAL NUTRITION. — SCABBING. — THE PROCESS BY ESCHAR. — THE MODELLING PROCESS OF THE LATE PROFESSOR MACARTNEY. — VARIETY OF STIMULANTS. — VITAL PROPERTIES OF THE GRANULAR STRUCTURE. — INFLUENCED BY THE STATE OF THE CONSTITUTION. — APPEARANCES DURING THE PROGRESS OF THE CURE. — VARIOUS FORMS OF ULCERS. — THEIR SITUATION. — CAUSES INFLUENCING THE DEVELOPMENT AND ORGANISATION OF GRANULATIONS. — IMPERFECT ORGANISATION OF CICATRICES. — THE ADHERENT ESCHAR. — HEALING UNDER A SCAB. — RELIEF OF PAIN, AND CONSECUTIVE RESULTS OF THE FUMIGATORY PROCESS. — ORDINARY PROCESS OF HEALING UNDER THIS METHOD. — IRREGULARITIES. — MODIFICATIONS REQUIRED IN THE TREATMENT. — THE MODELLING PROCESS INCOMPATIBLE WITH INFLAMMATION, OR HIGH EXCITEMENT. — THIS MODE OF HEALING ULCERS BEING THE MOST PERFECT AND DESIRABLE, THE SURGEON SHOULD ENDEAVOUR TO IMITATE THE NATURAL PROCESS AS CLOSELY AS HE CAN. — DIFFERENCE BETWEEN GRANULATIONS AND THE INTERSTITIAL DEPOSIT OF MOLECULES WHICH OCCURS DURING THE "MODELLING PROCESS:" THE ONE IS A GROWTH OF NEW PARTS, THE OTHER IS THE NATURAL GROWTH OF THE BODY. — "ULCERS FORM THE OPPROBRIA OF HOSPITALS," AND THE STUMBLING-BLOCK OF PRACTITIONERS.

Various definitions have been given by surgical writers of the term ulcer. Some describe it as "a solution of continuity, producing pus." Others add to this definition the circumstances of the sore "being chronic,"—"being produced or kept up by some internal cause,"—"having a tendency to spread," &c. Without entering into a disser-

tation on these points, which would lead me away from the practical object of the present work, I would describe an ulcer as "a loss of substance on some of the surfaces of the body, arising from, or accompanied by, interstitial absorption of the tissues." An ulcer is a superficial injury, produced by ulceration. But what is ulceration? The removal of the integral molecules of a tissue by absorption.

Two important actions are constantly going on in the human body—viz, nutrition and absorption. By the former, new materials are being constantly assimilated and laid down for the repair of the ever changing fabric of the body: by the latter, the old and worn out materials are removed, to make room for the fresh and more vigorous elements. In a state of health these two actions bear a fixed relation to each other, and the balance remains undisturbed. In disease, also, they come into play, and serve as the instruments of Nature, in the spontaneous cure of many diseases, in the natural reparation of many injuries. As a distinguished writer has well observed, it is a law of the human economy, that the arterial and absorbent vessels should work to one common end; and it is only by a careful study of the mutual operations which thus take place between the arteries and absorbents, that we can rightly understand the process of ulceration or the different modes by which the effects of that process may be repaired. Many diseased actions are nothing more than healthy actions either increased in intensity, or applied to purposes which they

were not, originally, intended to perform. Diseases arising from hypertrophy of tissues afford an obvious example of the former; ulceration may be taken as an illustration of the latter. The absorbent vessels possess the wonderful power of removing, in a gradual and unobserved manner, the whole, or the greater portion of the human body. The arteries, on the other hand, in the same imperceptible and regulated manner, supply the materials which have thus been removed; but let the balance be disturbed, and we have excess or loss—let diseased action commence, and certain tissues either become the seat of morbid deposit, or are removed altogether by ulceration. These are general effects, arising from the combined action of the nutrient and absorbing systems, but the same classes of vessels are constantly employed in re-organising or repairing such portions of the body as may have been disturbed by disease, or destroyed by injury. Here the power and (if we may venture to use the term) organic instinct of the absorbent vessels are curiously and effectively displayed. In cases of fracture the arteries furnish the uniting medium which afterwards becomes osseous matter, while the absorbents, like skilful workmen, are busily employed in removing every corner and projecting fragment which might excite irritation, and finally restore the bone as nearly as possible to its original shape. In the same way they remove the edges of the divided bone after amputation, so as to form a surface on which the soft parts can rest, and, in some cases of

necrosis, remove the whole of the dead bone through the system.

The removal of foreign bodies by ulceration, and the separation of dead parts from the living by the same process, furnish examples which may lead us to form some idea of the causes immediately giving rise to this vital act. When a ligature is placed round an artery, a certain degree of inflammation is set up; ulceration ensues, and just so much of the blood-vessel is absorbed as will permit of the removal of the ligature. The same thing takes place in the destruction of tumours by ligature. In case of the death of any part, from injury or mortification, the absorbents set to work round the useless parts, and a line of ulceration, drawn as regularly as if traced by a ligature, separates the living portions from the dead.

From these, and many other examples which might be enumerated, it seems probable that the law which governs the actions of the absorbent vessels is one enjoining them to remove parts which, from any cause, are rendered incapable of performing natural and healthy actions. The condition, then, which immediately precedes ulceration, and seems to be its proximate exciting cause, is an impaired state of vitality, or an alteration of texture, furnishing to the absorbents a stimulus for the removal of unhealthy, disorganised, or useless parts.

This principle explains satisfactorily, why newly formed parts (as the cicatrix of a wound), and morbid growths (as

fungous granulations, &c.), are so readily destroyed by ulceration, on the slightest stimulus; they give way because their vitality is weak, and their organisation is imperfect. The destructive effects of ulceration are, in the same manner, proportionate to the alteration which has taken place in the vitality and organisation of the parts attacked. Whenever the vital force of a part has been considerably reduced, in consequence of general debility, while its structure, is at the same time, altered by local disease, we have the most frightful and destructive forms of ulceration; and the degree of destruction is exactly proportionate to the combined effects of debility and disorganisation. This is seen in many diseases. In cancrum oris, for example, the extent to which the sloughing ulceration may proceed, will mainly depend on the debility of the patient and the degree of infiltration in the walls of the cheek. In those intractable and destructive forms of syphilitic ulcer, preceded by induration with a deep purple colour of the integument, the ulceration cannot be arrested until it has swept away the whole of the diseased parts; but any simple dressing answers as soon as it has reached the sound and natural skin. In phymosis, with extensive infiltration, we have the same irremediable destruction of parts; in a word, ulceration takes place wherever the vitality and organisation of a part have been seriously impaired by pressure or injury,—by debility or inflammation; and hence we derive this capital indication in the treatment of ulcers, which should never be absent

from the mind of the enlightened surgeon—viz., to raise the vitality, and remove that condition of parts which places them in a proper state for ulcerative absorption.

Having thus shown that an ulcer is produced by the absorption of tissues, weakened in vitality and disorganised in structure, we naturally arrive at the inquiry, how is an ulcer healed? To effect the cure of an open sore or wound in a state of ulceration, three things are obviously required. The first is to arrest the ulcerative destruction of parts; the second, to promote a new growth, by which the loss of substance may be supplied; the third, to produce cicatrisation, or the formation of new skin, whereby the injured part is protected and brought back, as nearly as possible, to its original and normal condition. The tendency to ulceration (if the principle which I have endeavoured to establish be correct) is mainly arrested by increasing the vital energy of the part, and improving the organisation.

The growth of new parts may take place under two very different conditions, which establish two essentially distinct modes of cure in the treatment of ulcers. According to one plan a new material, viz., granulations, is thrown up from the surface of the ulcer and gradually supplies the loss of substance produced by ulcerative absorption of the tissues; according to the second plan, we have little or no growth of adventitious structure, but the cavity of the ulcer is effaced, partly by contraction, and

partly by the same process of interstitial nutrition, which ministers to the growth and support of the body in a natural state. To the former of these modes belongs granulation; to the latter scabbing, the process by eschar, and the modelling process of the late Professor Macartney.

The healing of wounds and ulcers by granulation has been the prevailing idea of surgery since the birth of our art; and the chief object of the practitioner, in the cure of ulcers, has almost always been to promote the growth of healthy granulations as quickly as possible, and "laudable pus" has been an almost indispensable adjunct. As newly-formed structures, the production of granulations is favoured by whatever stimulates the vital or circulatory activity of the surfaces whence they spring, just as fungoid and other growths of the vegetable kingdom are promoted by stimulating manures; hence the immense variety of stimulants employed for the cure of ulcers, from the days of Hippocrates to the present time.

Granulations, when minutely examined, seem to be composed of a fine cellular tissue or membrane, composed probably of fibrine, and furnished with a copious supply of blood-vessels from the subjacent tissues. Different parts of this membrane are thrown up into small elevations or granules, varying much both in size and colour, according to the nature of the sore and the general health of the patient. When healthy, they present a vivid red colour, and are of compact structure. They are large and prominent

when the circulation is active; but they are small and brown, or flat and of a glossy appearance, whenever the general circulation is languid, or the local supply of blood retarded from any cause. Dr. Thomson informs us, that their temperature exceeds that of the body by two or three degrees, and daily experience teaches us that they are endowed with a very high degree of general sensibility; in fact, the vital properties of the granular structure seem to be a kind of compound between those of the skin and mucous membranes, and, as Dr. Macartney has observed, from this resemblance in their sensitive properties to the skin and the internal surfaces, the condition of every ulcer in a granulating state is liable to be much influenced by the state of the constitution. The surface of the granulations is naturally covered by an extremely thin pellicle, somewhat similar to the mucous epithelium; but whether this pellicle contributes in any way to the process of cicatrisation, I am unable to say.

This latter process, by which the healing of an ulcer is finally completed, presents some differences, according to the mode of reparation which has immediately preceded it; in other words, the cicatrisation of a sore, after granulation, does not take place under the same circumstances as after scabbing, or the modelling process.

The cicatrisation of an ulcer, over the surface of granulations, being the mode of cure which has prevailed from the earliest period of the healing art, is a process familiar to every practical surgeon. As the ulcer assumes a healthy

aspect, and the change from granulation to cicatrisation commences, several modifications occur in the appearance of the sore, which are worthy of notice; the surrounding tumefaction is dissipated, and all trace of inflammatory action, in the integuments immediately contiguous to the ulcer, disappears; the edges of the ulcer become thinner and less elevated, and are soon reduced to a flat surface by absorption of the granulations. While this is going on, the inflammatory blush round the edges of the sore declines, and is replaced by a pale, whitish circle, which occupies partly the surrounding skin, and partly the surface of the ulcer. Cicatrisation has now commenced at this circle, and the skinning process extends, more or less rapidly, from it towards the centre of the sore, along a whitish pellicle, which ultimately becomes an organised cicatrix. As the process of cure goes on, the granulations, by which the loss of substance from ulceration was repaired, are gradually absorbed, while the contractile power of the granular tissue on the surface of the sore, has a constant tendency to bring its edges together.

In this manner the surface of the ulcer daily diminishes, and, unless the healing process be disturbed or impeded, the size of the cicatrix bears but a very small proportion to that of the original sore. Cicatrisation goes on more rapidly at first, near the edges of the ulcer, and as it approaches the centre, its progress is more slow; in some cases, however, cicatrisation will commence at various points of the surface.

and the patches coalesce rapidly; but the cicatrix thus formed is usually irregular and puckered, because the granulations have been covered by skin before the absorbents had time to model them to the shape of the sore.

Circular ulcers, it is said, are more slow in healing than those of an irregular form: again, ulcers seated in loose cellular tissue will cicatrise more readily than those which occupy the skin closely adherent to subjacent parts; while daily experience teaches us that the process of healing over granulations is liable to be influenced by the state of the atmosphere, the mental condition of the patient, his general health, and a number of other causes, which modify, in an evident but not easily explained manner, the development and organisation of that delicate and capricious production called a granulation.

The cicatrix of a wound or ulcer never resembles, in a perfect manner, the tissue which it is intended to replace; it is imperfectly organised, and endowed with sensibilities quite different from those of the skin; hence the reason why recent cicatrices so readily give way under any derangement of health, or from local causes.

The process of cicatrisation, under an adherent eschar, has been described by Mr. Higginbottom, of Nottingham,* who assures us, "that wherever an eschar, made over the surface of a wound or ulcer, can be preserved adherent,

* *Loc. cit.*, page 9.

such wound or ulcer infallibly heals." The eschar is produced by applying the nitrate of silver lightly over the whole surface of the ulcer, and for some distance beyond its edges, on the surrounding skin. "The application of the caustic first induces a white film, which assumes a darker colour in a few hours, and subsequently becomes of a dark grey or black. As the eschar undergoes these changes of colour, it gradually becomes harder, and resembles black sticking-plaster. In the course of a few days, according to the size and state of the wound, the eschar becomes corrugated, and begins to separate at its edges, and it at length peels off altogether, leaving the surface of the sore underneath in a healed state."

Great care must be taken to avoid all causes which might detach the edges of the eschar; this is obviously requisite to prevent inflammation and suppuration underneath, by which the process of healing would be interrupted if not entirely defeated. The advantages of this plan are fully set forth by Mr. Higginbottom, who gives it a decided preference over scabbing; but it does not appear that there is any essential difference between the two modes of reparation. The eschar supplies a complete protection and defence to the surface of the ulcer, and allows the healing process to go on underneath, uninterruptedly and undisturbed. "Comparative trials," says Mr. H——, "have shown me, that while the scab is irritable and painful, and surrounded by a ring of inflammation, the adherent eschar

becomes totally free from pain and inflammation; and that while the scab remains attended by inflammation, and unhealed, the eschar is gradually separating, leaving the surface underneath completely cicatrised." Finally, "the success of the plan of healing by eschar is infinitely more certain, as well as more speedy, than that by scabbing."

From the description here given, it is evident that the mode of reparation by eschar differs little, if at all, from that by scabbing; and that it takes place without the formation of granulations, or the secretion of pus. As the mode of treating ulcers by medicated fumigations, which I have found so beneficial, involves the question of healing by the scabbing process, it will be necessary to enter into some details on this interesting, but hitherto neglected point of practice.

The original mind of the late Dr. Macartney, although influenced in many ways by his own peculiar ideas, clearly appreciated the benefit of healing under a scab. He says:* "When cicatrisation occurs under a clot or scab, there is every reason to believe that it does not proceed from the edges of the wound, but that it takes place over the whole surface at the same time, as the covering is usually detached at once. In this mode of terminating the cure, the cicatrix is pliant, and more nearly resembles the common skin than in other instances." And again: "No doubt, if a thin, pliant, and intimately adhering substance could be

* *Loc. cit.*, page 59.

formed on a wound, and in many cases of ulcer, it would be a most valuable discovery, by enabling us to imitate the natural scab at the most convenient time and in the best manner."

In illustration of the readiness with which wounds may be healed by the mode of scabbing, Dr. Macartney relates the following interesting case:—"Mr. M—— had set out from home, in order to go to the south of England, when he was attacked by a band of robbers. Although unprovided with arms, he made resistance, and in the conflict he received seven wounds, inflicted by bayonets and swords, on the side and arms. The gentleman, being anxious to conceal from his family the injuries he had received, pursued his journey as rapidly as possible to Margate, in order that he might be able to announce to them his safe arrival there. He never stopped on the way to have his wounds examined, nor did he undress himself, lest the clotted blood might be unsettled, and the parts consequently irritated. On his arriving at Margate, where I happened to be at the time, I examined his wounds, and was surprised to find they had all perfectly healed and cicatrised under the crusts of dried blood, with the exception of two bayonet stabs in the forearm, which contained a very little pus, probably on account of their situation, which subjected them more to motion than the others, from the unavoidable use of the hand."*

The process of scabbing during the use of fumigations,

* *Loc. cit.*, page 208.

so far as my opportunities have enabled me to observe it, seems to proceed in the following manner:—One of the earliest and most remarkable effects of the fumigation is to relieve pain in the affected part, and to diminish all inflammatory symptoms which may exist. The next result is the effusion of a layer of organisable matter, by which the surface of the ulcer is protected from the action of external influences. In a few hours after the employment of the treatment, the entire surface of the sore is covered by a thin, transparent pellicle, which has evidently exuded from the vessels of the part, now stimulated to a new and more healthy action. This pellicle is at first clear, and is probably an exudation of coagulable lymph or fibrine, and through it may be seen the floor of the ulcer, which has already assumed a more florid and healthy appearance. The pellicle, however, soon becomes opaque, and, as it coagulates into an organisable membrane, it is closely and, in a short time, firmly applied over the whole surface of the sore.

In some instances, where the ulcer is deeply excavated and of enormous dimensions, as in Plate 1 and 2, Figs. 1 and 2, the patches of exudation are spread here and there over the floor of the ulcer. The cavity of the ulcer now begins to contract, while the deficiencies produced by ulcerative absorption are rapidly filled up; the whitish margin (a most favourable indication) is obtained; the infiltration, and interstitial thickening and hardness of the surrounding tissues,

gradually disappear, and the skin assumes a more healthy colour. As the scab becomes more perfect, the suppuration diminishes, and soon ceases altogether, the discharge of pus being replaced by the exudation of healthy lymph, which, as it dries, contributes daily to the increase of the scab. Except under some circumstances to be noticed presently, the production of a granular membrane is trifling; indeed, wherever the scabbing process can proceed in a perfect manner, we have no granulations, but a thin pellicle of skin is formed under the scab, and when the latter is removed, or peels off, we find a flexible, smooth cicatrix, quite different from that which succeeds to granulation, and much more perfect in its appearance and properties.

From the mode of healing which takes place in scabbing, and from the nature of the cicatrix it produces, it seems highly probable that the "modelling process" first described by the late Professor Macartney, goes on underneath the scab. The peculiarly stimulant effects of the fumigation arrest, almost instantaneously, the morbid disposition which gives rise to the ulcerative absorption of tissues; this unhealthy and destructive disposition being changed, the natural growth of parts fills up the cavity of the ulcer, and when an equilibrium has been established between the reparative and modelling vessels, then the surface of the ulcer skins over, and a permanent cure is effected.

The correctness of this explanation is rendered probable

by the fact, that when any great loss of substance has occurred from extensive destruction of parts, the cicatrix sometimes follows the floor of the ulcer, without any of the puckering or inequalities which occur when it is formed over granulations, which render this latter species of cicatrix so imperfect.

It is necessary to mention that the scabbing process, such as I have now described it, can only be observed in its complete and perfect type, in ulcers of moderate dimensions. In larger sores, and in cases where the loss of substance has been extremely extensive, we may have more or less of the granulating process intermingled with it; still, the main feature of this mode of healing predominates. A regulated temperature, conjoined with the materials employed in fumigation, rapidly excites the nutritive functions of the part, and the floor of the ulcer is quickly raised to a level with the skin. This takes place without any increase in the quantity of pus secreted; without pain, or without irritation. The edges of the wound, if elevated and discoloured, soon put on an altered appearance; they become flattened, and evince a tendency to seek the centre of the ulcer. While this process is going on, the margin of the sore and the surrounding integuments assume a better colour; the inflammatory blush which occupied them disappears, and a whitish ring, extending for some distance beyond the edges of the ulcer, supplies its place.

This change of colour is one of the earliest and most decisive signs of improvement; whenever it occurs, we may be certain that a tendency to cicatrisation is generated. The large and deep ulcers, of which I now speak, cannot be made to heal, until the modelling process and contraction have reduced the superficies of the sore to a moderate size; cicatrisation then commences under the scab, but the manner in which the cicatrix forms, will be modified considerably by several circumstances. In some cases the cicatrix commences at the edges of the sore, and thence proceeds towards the centre; in others, the whole surface of the ulcer seems to skin over at the same time; while in some exceptional cases, we find that cicatrisation has commenced at detached points, and under distinct scabs, the points ultimately coalescing.

Such is the ordinary process of healing under a scab, when fumigations are employed; but in some old cases, where the leg is considerably diseased, and the surrounding tissues much thickened, the process is not so regular. In many of these cases the vitality of the part has been altered, not only by disease, but by antecedent treatment, and it is not surprising that the reparative actions should be more tedious and irregular. While one portion of such an ulcer is healing under a scab, another portion may be throwing up irritable or redundant granulations; this renders some modification necessary in the treatment, and causes some deviation from the usual

process of healing. Still, we are enabled to affirm that the treatment hereinafter described will triumph over every difficulty, and that, as soon as we can obtain the white margin round the ulcer, already noticed, improvement has already commenced, and will terminate in ultimate and permanent cure.

Sir Everard Home, in his work on ulcers,* describes the effects of nitrous acid on these sores, and a mode of healing during the use of this remedy, which closely resembles the eschar process of Mr. Higginbottom. The first effect of the dilute nitrous acid is to diminish the quantity of matter or pus; and, instead of giving a healthy, florid appearance to the surface of the ulcer, it produces a soft, ash-coloured coagulum, which partially covers the granulations; the coagulum is more firm near the edges of the sore, where it forms a complete crust, firmly adhering to the surface. When the ulcer is hollow in the middle, and gradually rises to the edges, the crust is seen round the circumference, while the softer coagulum occurs further in, and the centre of the sore is occupied by common pus. A succession of these crusts is formed upon the margin of the ulcer, and the parts rise higher and higher, until they come nearly to the level of the common skin. At this period the crusts remain adherent for a longer space of time, and on their removal a much more perfect cicatrix

* *Loc. cit.*, page 217.

appears than is usually met with in an ulcer cicatrised by means of other dressings.

Sir Everard Home remarks further, that the progress in the healing of an ulcer to which the diluted nitrous acid has been applied, differs much from what is commonly met with; the process of cicatrisation is much more rapid, and the new skin much more completely formed, very nearly resembling that of the surrounding parts. In various instances the skin was formed before the ulcer had been completely filled up, so that the margin of the new skin was a good deal lower than the surrounding, old integument; but some weeks after cicatrisation, this difference of level gradually disappeared. From the foregoing facts it seems evident that the nitrous acid of Sir E. Home acts in nearly the same manner as the nitrate of silver of Mr. Higginbottom, and produces cicatrisation under the surface of an imperfectly adherent scab, without inflammation, or any considerable attempt at granulation.

To complete this brief view of the different modes of healing, it is necessary to say a few words on the "modelling process" of Dr. Macartney. This process consists in re-organisation without any medium of lymph or granulations, the cavity of the wound being obliterated by a natural process of growth. It is incompatible with inflammation or any high excitement, and takes place when healthy parts, which have been injured, are placed in the most favourable circumstances for carrying on their

natural actions. In this process the pain arising from the injury soon ceases. No tumefaction ensues, separating the edges of the wound; there is no necessity for the effusion of lymph—no cavity to be filled up by granulations: the wound gradually diminishes in extent, until it is obliterated; or it may be cicatrised before the surfaces are abolished, after which the same process of natural growth goes on until no part of the original wound is left.

As the modelling process consists in the growing of the surfaces of the wound to the level of the skin, instead of filling up the interval by means of any newly-formed substance, the cicatrix is unusually small, pliant, and free from those callous adhesions or morbid sensations which render the cicatrix of granulative membrane so imperfect in structure and function.

That this mode of healing is the most perfect and desirable there can be little doubt, but it can only occur under favourable circumstances and in healthy parts. Whenever inflammation is prevented, and the organisation of the tissues has not been much impaired, Nature endeavours to employ this, her own method, in a more or less perfect manner: hence, in all cases where circumstances render it impossible to obtain this desirable end, the surgeon should endeavour to imitate the process as closely as he can; and, from what has been said, it seems reasonable to conclude that the process by scabbing in ulcers approaches as nearly to the modelling process as the nature

of the disease which it is intended to remedy, and the circumstances under which it is employed, will admit.

Many of the most important points connected with the history and treatment of ulcers depend on the question now before us; it may, therefore, be useful to examine, in some detail, the comparative merits of healing by granulations and healing by the modelling process, more or less modified.

It will, I imagine, be readily allowed that one of the chief objects to be attained in the healing of ulcers is to have the newly-formed parts as like the old as possible. This is essentially necessary to the facility and permanency of the cure, because in proportion to the deviation of the new parts from the natural standard in vital properties and organised structure, will be the difficulty of obtaining a cure, or rendering that cure lasting.

Now, the least reflection must convince us that granulations do not bear the same close resemblance to the old structures which they are intended to replace, as does the interstitial deposit of molecules which occurs during the "modelling process;" the one is a growth of new parts, the other is the natural growth of the body, applied to the purpose of repairing an injury; the one is a morbid process, the other an essentially healthy action; and we might even go so far as to affirm, that unless nature came to our aid during the process of granulation, and removed by absorption the greater

portion of these granulations which our stimulants throw up on the surface of an ulcer, we should never be able to obtain the permanent cure of an open sore.

Various explanations have been given of the disagreeable truth, "that ulcers form the opprobria of hospitals," and it might be added, the stumbling-block of practitioners. The chief reason is, I am convinced, the idea—which has prevailed universally from the earliest ages of medicine—that they are only to be healed through the medium of granulations, and a more capricious or unmanageable set of servants than these same granulations, the unfortunate surgeon could not have selected. Themselves the produce of stimulation, like hot-house plants, they are peculiarly subject to changes under slight influences—at one moment starting into life with an unhealthy and inconvenient activity—at another drooping, withering, and dying under the means employed to give them life and vigour.

As newly-formed parts, of extremely delicate structure, endowed with high sensibility, and from their vital properties much prone to sympathise with the mucous surfaces, granulations are very liable to change, under the influence of constitutional or local causes. Every surgeon is familiar with the fact, that the granulative structure of an ulcer is influenced in a most extraordinary and remarkable manner by the state of the general health.

"The appearance of the granulations," says Sir E. Home,

"is influenced considerably by any thing that affects, in the slightest manner, the patient's general health." It undergoes a change upon the least diminution of constitutional strength; and any serious disturbance of the economy will cause the disappearance, in a single night, of new structures which may have required weeks, or even months, for their formation. Mental anxiety also, or violent mental emotions, will produce the same unfavourable effects on the imperfect and unstable structure of granulations. Even sudden atmospheric changes, acting on susceptible constitutions, are capable of exerting an injurious influence on them: of this Sir E. Home records a striking example.* "After a naval fight between the English and French, in the year 1778, the wounded seamen from Admiral Keppel's fleet were all carried into the Naval Hospital at Plymouth. Amongst them were several hundred patients with ulcers on the legs. Whenever there was any violent and sudden change in the weather, from a dry to a moist state, it had an immediate effect on all the ulcers in the hospital, giving them universally an unhealthy appearance. Instead of pus, the granulations threw out an exudation of coagulable lymph, which looked exactly like melted tallow; and when the weather changed again and became dry, they put on a more healthy appearance."

Even the most perfect and compact granulations, if not

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* *Loc. cit.*, page 81.

skinned over within a certain time after their formation, become weak and incapable of resisting the natural tendency of the absorbents to remove all weak and newly-formed structures.

The great difficulty of managing granulations constitutes another strong objection to this mode of healing ulcers. They are apt to give way under the slightest irritation, from pressure, undue exercise, or improper dressing, &c., and this weakness, or want of resisting power, is in proportion to the quickness of their growth, and their imperfect formation from the unsound surfaces underneath them. Animal growths are like many productions of the vegetable kingdom—the more rapidly they grow, the more imperfect are they in structure, and the weaker are they in vitality. On the other hand, unless we force the growth of granulations on an indolent ulcer, it may remain for an indefinite period in its state of indolence: hence the surgeon is placed in an unpleasant dilemma between two opposite principles; he is compelled to stimulate the sore, for the purpose of filling up its cavity by granulations; and he is under the necessity of keeping down his new growth by escharotics, because the granulations are not disposed to form new skin whenever they rise higher than the level of the surrounding integument. Between stimulants to elevate, and escharotics to depress, the surgeon finds himself nearly in the same predicament as the perplexed *petit-maitre* who employs straps to keep down his inex-

pressibles, while he has recourse to braces to keep them up.

The natural weakness of granulations, and their tendency to become absorbed without any apparent cause, is well illustrated by what takes place every day in our public hospitals. A patient is admitted with an indolent ulcer on the leg: he is confined to bed, and a warm poultice* is applied; in a short time the surface of the sore becomes clean and throws up granulations, which appear to be strong and healthy. Tired of confinement, and encouraged by the seeming improvement, the patient gets out of bed and walks about; but the tender and capricious growths are unable to bear this sudden disturbance, and are speedily removed by absorption. The man now returns to bed, and remains there perhaps until the ulcer is cicatrised; but the skin is formed over the same imperfect granulations, and the cure is apparent, not real. The moment he leaves his bed and resumes his accustomed occupations, the skin gives way, the granulations disappear, and the ulcer is soon as large as it was before. In indolent ulcers, then, the great difficulty is to get granulations which will stand their ground; and this difficulty, which baffled all other modes of treatment, has been only partially removed by the more successful methods of compression, or support without pressure.

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* Linseed meal is used in very considerable quantities, in many hospitals, for making that disgraceful, filthy, and non-scientific combination called a poultice—a mess better suited for the stomach of a pig than for the leg of a human being.

In the indolent ulcers, also, the appearance and properties of the granulative tissue are perpetually changing with every application which may be used during their growth; and each dressing, applied for any length of time, seems to lose its efficacy, from the mere circumstance of the tissue becoming accustomed to the stimulant. The practitioner thus experiences great difficulty in discovering any remedy of real and permanent value, capable of producing that grand desideratum, the painless, rapid, and permanent cure of an ulcer that may have during many years embittered the life, or seriously injured the prospects, of the person who may be the subject of so serious a misfortune. Further, the surgeon will have remarked that, in a great majority of instances, his best-directed efforts have been counteracted by temporary, slight, and, indeed, scarcely appreciable changes in the constitution of his patient, and that, to their extreme mortification, annoyance, and discouragement, the weak and irritable structure on which his patient and himself had built up their expectations of a cure, has disappeared, and left them to pursue other treatment, perhaps as unsatisfactory in its result as the previous one.

The observations which I have ventured to offer on the subject of granulation may not be in accordance with generally received ideas; but they are the result of much reflection and experience in the treatment of a disease which has long occupied my earnest attention. They

are, moreover, in accordance with the views which I have given of the physiology of ulceration and the healing process; and I would fain hope that an attentive consideration of the principles which I have attempted to establish in the commencement of this treatise, may finally lead, not only to a more just theory of the nature of ulcers, but to an enlightened and rational mode of treatment.

CHAPTER III.

CAUSES OF ULCERS.

PRINCIPAL CAUSES OF ULCERS AFFECTING THE LEGS.—FEEBLENESS OF THE CIRCULATION IN THE LOWER EXTREMITIES.—ACCIDENTAL INJURIES.—THE ERECT POSITION.—GENERAL OR CONSTITUTIONAL CAUSES.—LOCAL CONDITION OF THE TISSUES.—IMPAIRED VITALITY.—ABDOMINAL CONGESTION.—VARICOSE CONDITION OF THE VEINS.—INDICATIONS IN THE CURE.—NECESSITY OF BRINGING BACK TO A NATURAL CONDITION THE DISORGANISED TISSUES.—CONDITION OF THE LIMB PREDISPOSES TO ULCERATION.—INFLUENCES CONVERTING A SLIGHT INJURY INTO AN INTRACTABLE SORE.—OBSTRUCTION TO THE CIRCULATION IN THE VEINS A FREQUENT CAUSE OF ULCERATION.—INTERSTITIAL DEPOSIT OF SERUM AND ALBUMEN. FIBRINOUS DEPOSITS IN THE VEINS.—CHANGES IN THE TEGUMENTARY COVERING.—IMPORTANCE OF ATTENDING TO THE GENERAL CONDITION OF THE LIMB.

In the preceding observations the remote or general causes of ulceration have been pointed out; and it now remains to explain the well-known fact, that the lower extremities are more subject to the formation of ulcers than any other part of the human body: in other words, to indicate the principal causes of ulcers affecting the legs. These causes are numerous and varied. One of the most obvious, is the dependent situation of the ex-

tremities, and their remoteness from the centre of the circulation. These circumstances necessarily tend to weaken the circulation of the vital fluid in these parts, and thus lessen that resistance to disease which requires a certain amount of vital energy and action for its reparation.

Surgeons have long since remarked the tendency to ulcerate of parts which are situate at a distance from the heart—a tendency easily explained by our principle of "impaired vital energy." Sir A. Cooper observes, "that the parts more remote from the heart ulcerate more readily than those in the vicinity of the heart. The chief reason of this is that the circulation in these parts is feeble. They have less strength of circulation, and, consequently, give way to ulceration more readily." In parts which, like the lower extremities, are constantly dependent, the circulation is likewise feeble, because the blood has to run upwards—or ascend against its own weight—to counteract the laws of gravity: hence the sensation of coldness in the feet, of which so many delicate people complain; hence the discoloured appearance of so many legs; the congestion of venous blood: the effusions of serum, and many other changes which promote, in a remarkable degree, the occurrence of ulceration. Accidental injuries are likewise a frequent cause of ulcer, and it is obvious that this cause must frequently come into operation in many of the trades and occupations by which the working classes are exposed to injury. The lower extremities of the working

man have to sustain a considerable amount of what may be termed extra duty; the thinly-covered and sharp surface of the tibia is constantly exposed to blows, contusions, and other accidents; the patient also generally works for a protracted period in the erect position; and these circumstances explain, not only the frequency of ulcer of the leg amongst the poorer classes of society, but the fact, first established by M. Parent Duchatelet, that it requires more time to cure an ulcer on the right leg than on the left.*

It is, however, a curious fact, that the left leg is more frequently the seat of ulcer. In 510 cases examined by M. Duchatelet, it occurred 270 times on the left, and 240 on the right leg, but the average period of cure was five days less for the left lower extremity. The researches of the same distinguished writer also prove that the most evident cause of ulcer of the leg amongst the working classes is occupation in a standing position; and hence the frequency of this affection amongst carpenters, sawyers, masons, printers, washerwomen, &c. On the other hand, he remarks that persons who stand all day long in the water, as the wood-porters of Paris, are not peculiarly subject to it.

In addition to the local causes of ulcer now pointed out, we have the general or constitutional causes; but I cannot help thinking that it has been latterly too much the fashion

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* "Annales d'Hygiéne Publique," tom. iv. p. 237.

to give an undue weight to the influence of constitutional causes in the production of this disease. At all events, it seems clear to me that the so-called constitutional causes act chiefly by determining a local condition of the tissues of the limb, which gives rise to, or promotes, a tendency to ulceration. The main principle is, however, the same in all cases—viz., some alteration of structure, or some impairment of vitality in the part. It is thus that constitutional derangement acts, and we find, accordingly, that the states of general constitution, most intimately connected with ulcer of the leg, are those which have a tendency to retard the due circulation of blood in the lower extremities. Thus, general debility, arising from previous disease, want of food, &c., will induce indolence of circulation in the parts most remote from the heart.

The same effect is produced by any disease which offers considerable impediment to the circulation of blood in any part of the body; and affections of the abdominal viscera are above all others included in this class, from the connection existing between the veins of the leg and those of the abdomen. The effects of impeded abdominal circulation on the lower extremities are familiarly illustrated by the swelling of the ankles and legs, to which so many pregnant women are subject. This condition of the legs, which in some cases consists in an effusion of serum—in others constitutes elastic œdema—clearly depends on the mechanical impediment to the free circulation of blood

offered by the impregnated uterus; in many cases it is accompanied by enlargement of the veins of the limb, and, from its frequent recurrence, often induces such a permanent change in the tissues as leads to ulceration of a very severe and intractable character.

A varicose condition of the lower extremity may be regarded as one of the most frequent predisposing causes of ulcers. Mr. B. Phillips mentions that, of 203 cases of ulcerated leg occurring on the left side, 159 were manifestly connected with this condition of the veins. The connection between the cause and its effect will be readily understood, if we bear in mind what has been already said on the tendency to ulceration of parts which have undergone any considerable change of structure, or whose vitality has been impaired either through diminution of nervous power, or any impediment to the circulation of the blood. Both these conditions exist, to a remarkable extent, in varicosed limbs. The obstruction to the circulation is at once and clearly indicated by the tumid appearance of the veins, which seem ready in many places to give way, being unable to overcome the obstruction.

On the other hand, the aspect of the whole limb shows that considerable changes have taken place in the organisation of the superficial and deep-seated tissues. This is a most important point in the history of ulcers of the lower extremity, yet few surgeons have bestowed upon it that attention which it imperatively demands. We have minute

descriptions of the varieties of ulcer; every appearance or change of aspect which the sore may assume has been dwelt upon; the causes, whether constitutional or local, have been sought after; in short, if we may employ a metaphorical expression, writers have directed their whole attention to the plant, without thinking it expedient to notice the nature or conditions of the soil in which it is developed. Yet, on the condition of that soil depends many of the phenomena of the sore seated in it, and, as in the vegetable kingdom, many fungous excrescences will not shoot forth from a tree, unless its bark be previously diseased, so habitual ulcer chooses, as its seat of predilection, the disorganised tissues now alluded to.

This principle, on which I cannot too strongly insist, explains not only why ulceration attacks the lower extremities so frequently, but why ulcers of these parts are so difficult to heal and so apt to recur. It also leads to a most important indication in the treatment of ulcers—viz., that our attention should not be confined to the mere sore, but that we should employ every effort to bring back to a natural state the disorganised tissues in which the sore is seated. Without due attention to this point, the surgeon can effect little towards the permanent cure of habitual ulcer. Galen has told us that sound granulations are not to be generated from unsound flesh, and we might as well expect to erect a stable superstructure on a foundation of sand, as to effect the permanent cure of an ulcer which is

based on the œdematous and infiltrated tissues of a diseased and varicose leg.

The condition of limb which predisposes to, or coexists with ulceration, must be familiar to every surgeon who has any experience in this branch of the healing art. In many cases it precedes ulceration by several years, and is evidently the disposing influence which converts the result of an ordinary injury into an intractable sore. In other cases we cannot ascertain whether the existence of ulcer has been preceded by this peculiar state of the lower extremity, but we have abundant proof that the former is intimately connected with the latter, which is kept up and often aggravated by it.

Whenever the circulation through the leg is retarded by any cause, the first and immediate effect is felt by the veins. The thin and yielding parietes of these vessels become gradually distended by the column of blood; some of the valves give way, or cease to act in a perfect manner, and the incumbent weight on others is thus increased; the distension becomes greater, and the veins assume a knotted, tortuous, and varicose appearance. The circulation of blood through the limb is now permanently impeded, and a constant state of congestion is the consequence. But it is a law of the human economy, applicable to the venous as well as to the arterial system, that whenever any obstruction occurs to the due circulation of the blood, which the vessels are unable to overcome, they

endeavour to relieve themselves by throwing off the fluid portion of the blood. This law is manifested in many cases of old-standing and obstinate ulcers. The veins unable to resist the constant and burthensome pressure of an overweight of blood, permit its more fluid particles to exhale through their parietes; the cells of the cellular tissue in the immediate vicinity of the distended veins are thus obstructed and often broken down; the effect becomes a cause, and reacts on the original cause of exhalation by further impeding the natural circulation through the limb; the infiltration gradually increases, and at length the lower extremity is one shapeless mass of ill-conditioned and spongy infiltrated cellular tissue; cold to the touch, insensible, and prone to ulcerate on the occurrence of the slightest accident, or without any exciting cause (*vide* Case Chambers). In some cases the interstitial deposit of serum and albumen is confined to the immediate vicinity of the ulcer, or to that portion of the limb where obstruction to the return of venous blood is most evident; but in many other cases the spongy or indurated condition of the cellular tissue now alluded to, extends half way up the leg, or even higher. But simple infiltration of the cellular tissue is not the only effect of the condition now described; it seems highly probable that the over-distended and disorganised meshes of the tissue are often the seat of chronic inflammation; for the swollen limb, instead of being soft and spongy, may become so indurated

that the finger cannot make the slightest impression on it, while it is, from time to time, the seat of constant and exhausting pain. In other instances it has appeared to me that fibrinous deposits in the veins constitute, in conjunction with the above-described condition of the limb, a serious and frequently insurmountable obstacle to the cure by the ordinary methods of treatment (*vide* Case A. Z.).

The skin, likewise, undergoes a variety of changes consequent upon those which have taken place in the more deep-seated tissues. The blood, being unable to find its way freely through the larger trunks, is driven back on the capillary veins of the skin. The integument assumes a bluish-speckled appearance, which soon deepens into a purplish or brownish copper-coloured tint; it becomes hard and thickened; or it may present an uniform, smooth, and polished surface: if an ulcer already exist, the altered condition of the skin is evidenced by a deep brown or purplish circle, extending to a greater or less distance round the sore, and showing that irritation has been added to the other causes of disorganisation; in a word, the superficial and deep-seated tissues of a limb which has been the seat of habitual ulcer for any length of time, are always more or less affected in the manner just described. The ulcer itself is but one item in the disease, and I feel convinced that the want of success which has hitherto attended the surgical treatment of ulcers mainly depends on the practitioner having neglected the general condition of the limb in his

anxiety to heal the sore. The method of treatment by compression was an important improvement, because applied to the general and local affection; and if the treatment which I adopt have any merit, it rests on the fact that it is calculated not only to heal the sore, but to remove in a most rapid manner that condition of the tissues which, is, I might say, essential to the existence of habitual ulcer.

CHAPTER IV.

VARIETIES OF ULCER.

VARIETIES OF ULCER.—DIVISIONS OF EARLY WRITERS.—MINUTE DISTINCTIONS OF MODERN AUTHORS UNNECESSARY.—THE VARIETIES GENERALLY DESCRIBED ARE RATHER COMPLICATIONS.—ULCERS ATTENDED WITH INFLAMMATION.—INDOLENT ULCER.—IRRITABLE OR PAINFUL ULCER.—VARICOSE ULCER. THE METHOD BY FUMIGATION CHIEFLY USEFUL IN REMEDYING OR REMOVING THE EFFECTS OF COMPLICATION.

The distinction of ulcers into varieties or species has much occupied the attention of surgeons; but it may well be doubted how far these nice distinctions are of use in a practical point of view.

The earliest writers divided ulcers into local and constitutional, and treated the various appearances which these two forms occasionally assume, rather as complications superadded to the original disease than as distinct varieties of the evil. This seems to be the most rational and simple mode of viewing the subject. Modern writers have, unquestionably, added little to our knowledge by their minute nosological distinctions, which are often little better than hypothetical conjectures. We have

callous sores, indolent sores, fungous sores, irritable and inflamed sores; ulcers without action, and ulcers with too much action; ulcers arising from the state of the fluids, and ulcers depending on the condition of the solids. We have the divisions of Bell and Home; of Metzler, Rust, Walther, Langenbeck, and a host of others; yet a slight consideration will show that, in many cases, these distinctions are founded on characters which are not constant or fundamental, but are rather transitory and accidental.

The external appearance of an ulcer, or the leading symptom locally connected with it, affords very uncertain data for classification. The different states of the constitution of the patient, atmospheric influences, changes of diet, nervous impressions, &c., are so many circumstances which rapidly change the appearance of an ulcer, and render the sore, which to-day was indolent, to-morrow irritable or inflamed. Besides, it is not uncommon to find two or more characters united in the same sore: thus, an ulcer may be inflamed and irritable; callous and indolent; fungous and weak. From these, and many other considerations, which the practical tendency of the present work forbids me from entering on, I am inclined to consider all ulcers (not specific) under one common head, and to regard the species described by authors as so many complications superadded to the loss of substance from interstitial absorption, which constitutes simple ulcer.

The complications now alluded to must, of course, be treated by appropriate means, at the same time that we endeavour to promote the healing of the sore, and on this account some brief notice of them is necessary.

Whether inflammation be the proximate cause of ulceration, as many writers contend, or not, it is certain that some degree of inflammatory action accompanies the origin and progress of every ulcer; and any remarkable excess of this action constitutes the most common complication of the disease. Here, then, we have the '*inflamed ulcer*,' or ulcer with acute or chronic inflammation.

When an ulcerated surface is attacked by acute inflammation, the state of the surrounding skin affords a ready indication of the condition of the sore. The red marginal blush becomes more or less extended, according to the severity of the inflammation; and we have a deep red circle of hot, inflamed, and painful integument around the sore; the discharge from the surface of the sore is also altered; the secretion of pus may be more abundant, or it may be suppressed altogether, being replaced by the discharge of an ichorous fluid, tinged with blood, in considerable quantity. If the inflammation be violent, the granulations give way, and black patches, with a fetid discharge, indicate that portions of the cellular tissue at the bottom of the ulcer have been struck by gangrene.

Chronic inflammation gives the chief character to the sore which is so well known under the name of '*indolent*'

at all our public institutions. It is from this species that a great majority of those affected with ulcer of the legs suffer. Sir E. Home, who informs us that it is likewise extremely prevalent in the army, has given a very good description of the indolent sore. It occurs, for the most part, in persons beyond the middle period of life, who have suffered from any excess or deprivation. It occupies the whole depth of the integument, and often extends into the cellular tissue subjacent, or even to the muscles. A dark brown or purplish circle of diseased integument surrounds the edges of the sore, and a considerable portion of the limb is the seat of the interstitial deposition which has been noticed in the preceding chapter. The granulations are of a smooth and glossy appearance, while the bottom of the sore, which is commonly level, or nearly so, is covered by an adherent layer of pus, mixed with coagulable lymph.

The indolent sore, however, is very liable to assume an irritable appearance under any temporary disturbance of the general health; but it soon falls back into the state which constitutes its leading characteristic. Its duration is unlimited, many sores of this kind, when once formed, continuing during life. Still, attempts at reparation are made from time to time. Under the influence of rest, stimulant applications, pressure, &c., granulations are occasionally thrown up from the surface of the sore, and the patient is deceived by the hope of an approaching cure;

but the granulations are absorbed more quickly than they were formed; in a few days the reparative efforts of weeks or months are swept away; the ulcer assumes its original aspect of indolence, and the patient, wearied out with frequent disappointment, ceases to adopt any treatment, and submits to the infliction of an evil which he has been led to consider as beyond the power of medicine to remove.

The *irritable* ulcer is a source of great affliction to the patient, and of constant annoyance to the baffled practitioner. This variety of sore more commonly occurs about the middle period of life, and in persons not much exhausted by previous disease. Its ravages are chiefly confined to the skin and superficial integuments; the edges of the sore are sharp, jagged, and undermined; its cavity is unequal, not furnishing distinct granulations, but presenting a whitish, spongy surface, which secretes an ichorous discharge, often of a very irritating nature. The surface of the ulcer is apt to bleed on the slightest touch, and the acute pain to which it almost constantly gives rise, constitutes its chief and most distressing character. The pain, as Sir E. Home remarks, usually comes on in fits, at evening, or during the night, and, when violent, is often attended by spasmodic motions of the limb, which sometimes extend to different portions of the body.

The *varicose* ulcer, concerning which so much has been written, is merely a sore complicated with a varicose con-

dition of the veins of the lower extremity. This complication generally gives to the sore a peculiar character, well known to all practical surgeons; but the character is derived rather from the appearance and condition of the neighbouring tissues, than from any constant peculiarities exhibited by the ulcer itself. This variety is of very frequent occurrence—a circumstance which we can readily understand, from the great tendency to venous congestion in the lower extremities, produced by a number of causes, to which it were superfluous here to recur. The varicose ulcer is frequently indolent in character, but often becomes irritable and painful: it is, under ordinary modes of treatment, extremely difficult to cure; and this acknowledged difficulty mainly depends on the condition of the neighbouring tissues, resulting from impeded circulation, and the impaired vitality consequent thereon.

This form of ulcer is also especially liable to relapse, not from anything inveterate or intractable in the ulcer itself, but because the modes of cure generally adopted, being directed only to the healing of the sore, leave untouched the causes which produce it. Hence, the ulcer, which cicatrised under the effects of equable support or compression and rest, with the horizontal position, again gives way as soon as these remedial means are dispensed with; while each relapse not only tends to confirm the disease, and render it habitual, but offers a fresh obstacle to a permanent cure, by increasing the morbid condition

of vessels and tissues on which the malady mainly depends.

It is in cases of this kind, extensively complicated with changes of structure in the neighbouring tissues, that the success of the treatment which I have adopted, after many experiments and long experience, is most triumphantly manifested.

CHAPTER V.

THE AUTHOR'S TREATMENT OF ULCER.

VAPOUR OF SULPHUR AND IODINE.—APPARATUS AND REMEDIES.—REASONS WHY THE OLD TREATMENT FAILED.—SUPERIORITY OF FUMIGATION.—COMBINED ACTION OF A REGULATED TEMPERATURE WITH IODINE AND SULPHUR.—PHYSIOLOGICAL AND REPARATIVE EFFECTS OF HEAT ON THE HUMAN BODY.—ACTION OF SULPHUR.—EFFICACY OF IODINE IN THE EXTERNAL TREATMENT OF MANY DISEASES.—EFFECTS OF THE COMBINED REMEDY.—ITS SUPERIORITY OVER OTHER MODES OF TREATMENT—AUXILIARY MEANS.—GENERAL CONCLUSIONS.

The principles which should guide the surgeon in the treatment of ulcer have, I trust, been correctly laid down in the preceding portion of this treatise. They are consistent with our experience of disease, and with the most enlightened views of human physiology, and it was by a long and attentive consideration of them that I was led to work out the peculiar mode of treating ulcers, which I now proceed to describe. This consists in the application of the fumes of sulphur and iodine to the surface of the ulcer and to the adjacent tissues, through means of an apparatus which I have constructed for that purpose. The apparatus in itself is extremely simple. It is composed of a series of mahogany boxes, having in the cover of each a round aperture,

for the reception of the limb. Each box communicates below with the engine-room of my establishment, whence heated air or warm vapour can be passed into the apparatus, as the case may require. On the bottom of the box is placed a plate of heated metal, and on the latter the powder of iodine and sulphur, which is volatilised by heat. The relative quantities of the medical agents—the time of application of the remedy — the temperature at which it is applied—the necessity of calling to our aid heated dry air or vapour—these and many other circumstances must be regulated by the peculiarities of each individual case, and can scarcely be comprised in any general description. For ordinary purposes, a powder containing from two or three grains of iodine to half a drachm of the flowers of sulphur, will be sufficient; but the relative proportions of the remedies must be varied according to the expediency of giving preponderance to the action either of the iodine or the sulphur. This can only be learned by careful examination of the case, and by experience. Sometimes we find that even a small proportion of iodine will exercise a strongly stimulant influence on the sore; in other cases the sulphur seems to act most beneficially. The time, also, during which the fumigation is to be continued can only be determined by experience and experiment. As a general rule, a quarter of an hour may be stated as the average time; but many sores and many patients will not bear this moderate application; while, on the other hand, either from the con-

stitution of the individual, or the indolent and insensible condition of the ulcer, we, in other cases, must prolong the period of fumigation, repeat it more frequently, and increase the proportions of the materials employed. The degree of temperature, as we shall presently see, is not without its influence; a moderate temperature producing a soothing effect, while a high one unquestionably excites; hence the temperature of the box must be regulated by the nature of the case and the feelings of the patient; an indolent sore will require a greater degree of heat, while an inflamed or irritable ulcer must be treated by the lowest temperature at which sulphurous gas can be generated. The number of fumigations necessary for the cure of any given case of ulcer cannot of course be determined beforehand. In some cases a fumigation every second day is all that the patient can bear with advantage; in others it must be repeated every day, and occasionally twice a-day. The chief rule for our guidance must be the effect which the remedy produces on the disease. So long as the plastic exudation continues to be thrown up from the surface of the sore; so long as its edges are surrounded by the white border, and so long as contraction of the ulcer with cicatrisation proceeds, we may be confident that the case is progressing favourably towards a cure.

To the idea of employing the sulphur and iodine fumigation as a mode of treating habitual ulcer of the leg, I was led, partly through a knowledge of the frequent failure of all

ordinary methods of treatment, and partly from reflecting on the beneficial effects which these powerful remedies confessedly produce on ulcerative diseases of the skin, and other analogous maladies. Ignorant, until recently, of the curious passage which I have cited from Banester (for my time was fully occupied by the laborious practice of my profession), the theory of fumigation as a treatment for ulcers was entirely my own. Having made numerous experiments, sometimes with iodine alone, sometimes with sulphur, and again with both remedies conjointly, I applied the practice in the case of A. B., which was published in the LANCET, for July 7, 1838. Since that period I have been actively employed in a practical application of this method to the cure of disease, and in earnest, and, I trust, not unsuccessful efforts, to render it more perfect. That sulphur fumes had been employed in the treatment of ulcer, we know, from the case of Dr. Gales, which I have published in another part of this work; that heat had been used for a similar purpose we learn from M. Guyot's treatise; iodine, also, may have been recommended, though I am unacquainted with any example: but the methodical application of these three agents conjointly to the treatment and cure of habitual ulcer was first proposed and carried into execution by the author; and if any credit attach to the discovery, he thinks himself in justice entitled to it.

All candid medical men will admit, that without some original attempt to improve the treatment of ulcers, we

must have continued in the old and unsatisfactory course, which generally led to disappointment. If we except the method by compression, it is certain that the remedies and modes of treatment hitherto applied for the cure of habitual ulcers were eminently unsuccessful. The causes of failure were inseparable from the mode of treatment employed, and have been fully explained in a preceding chapter. Under the ancient method, the sole aim of the surgeon was to produce granulations in sufficient quantity to fill the cavity of the sore, after which cicatrisation was encouraged by the use of astringent and various other remedies. This was an attempt to build a solid superstructure on a foundation of sand, and necessarily failed. In addition to this, we have to remark, that under the old modes of treatment, the condition of the limb, and of the tissues in the immediate vicinity of the ulcer, was entirely neglected. The remedies were applied simply to the surface of the sore, for the purpose of exciting a healthy action in that particular part, and of promoting the growth of granulations; but they could have no effect on the infiltrated and disorganised cellular tissue surrounding and supporting the ulcer—on the diseased skin near it—on the disabled blood-vessels of the limb, from which unhealthy secretions or exudations were perpetually poured out, thus affording a nidus to the disease, and rendering its permanent eradication impossible. In short, we find nothing which approaches to

a rational method of treatment until we come to the laced stocking of Wiseman, and the strapping of Baynton. The principle of this treatment is manifestly support and pressure; the one inducing the formation of firm granulations, and aiding the natural tendency of the sore to contract; the other acting on the whole limb, promoting the absorption of morbid deposits, and contributing to a more active circulation of blood in the limb. This was an important improvement; but the method of treating ulcers by mechanical support is far inferior to that by fumigation.

The former fulfils *one* indication only, and is open to many objections. It is a well-known fact, that many patients labouring under ulcer of the leg, are totally unable to bear any degree of artificial pressure, however tenderly or skilfully applied. Such is the irritable nature of the sore—so exquisite is the pain produced by every external application—so sensitive has the nervous system become, from long-continued irritation and habitual suffering, that the use of bandages or strapping is quite inadmissible; even the light touch required for the application of an ointment is often followed by an inconceivable degree of general and local disturbance. Even when we succeed in healing a large and old ulcer by the means ordinarily employed, we are never certain that the cure will be permanent; while the substances employed in the composition of the plaster frequently excite ulcerative inflammation of the unhealthy skin in the neighbourhood of the sore.

In the treatment of ulcers by fumigation, according to my method, three remedial agents of great power, yet endowed with different properties, are employed. These are sulphur, iodine, and heated air. And it may be well to bestow a few words on each, separately, before we speak of the effects produced by their combined agency, and the advantages which distinguish this method from all others. The action of heated air on ulcers, wounds, &c., was first clearly pointed out by Dr. Guyot,* in a remarkable work which he published at Paris, in 1842; and as the treatise is not much known in this country, a brief analysis of its contents may be useful. Dr. Guyot commences with the proposition that "the proximate and determining cause of the formation of living beings, is heat." In the inorganic world, bodies are formed by attraction and repulsion, depending on affinity, which latter seems to be intimately connected with electricity. In the organic world, it is difficult to arrive at the primary cause of life; but it may be asserted that heat is the chief, if not the sole agent, by which the dormant elements of an organised body are excited to living action. Let us consider the condition of a seed, a germ, an egg. Without the prolonged action of a vivifying principle, the seed would remain a seed—the egg, an egg; and this principle is heat. Again, it is to

* De l'Emploi de la Chaleur dans le Traitement des Ulcères, des Plaies, &c., par M. le Docteur Jules Guyot. Paris, 1842.

be remarked, that the organic affinity on which all the phenomena of life depend, is only exercised within the narrow limits of a defined temperature. Beyond these limits the tissues cease to be formed—the functions are suspended, and the individual either perishes or presents all the appearances of death. Nothing can supply the essential ingredient. Take away heat, and you take away life with it. Heat, then, is the principle which determines the formation of living organised beings; and that such is the case may be proved by every fact connected with the germination of plants, or the development of the embryo.

M. Guyot's next proposition is, that the main objects of organisation are "to produce and maintain a certain degree of heat." For the development and ultimate establishment of life, three conditions are requisite. The first is the application of a certain degree of temperature, which excites into vital activity the molecules of the organised being to which it is applied. The second is the immediate presence of certain nutritive substances, on which the embryo, thus excited by heat, may act. The third and last condition is, the power of keeping up, in an independent state, the vital activity originally imparted by extraneous temperature—of maintaining a degree of heat equal to that which first excited the germ of life. In all classes of beings, the degree of animal heat for each species is the same as that required for the development of the embryo. Hence, the earliest functions exercised by the animal in a state of independent

existenee, are preeisely those which are destined to generate and keep up animal heat. Respiration—the most powerful souree—is the first act of animal life. Circulation of the blood, also, is indispensable: and assimilation of food—to furnish a supply of matter, which is carried to the lungs by the blood vessels, and thus submitted to the action of the air.

As a third proposition, the author states that "The functions and phenomena of life are dependant on the temperature peculiar to each species of animal."

Heat is not only the first cause of life, but it presides over all vital functions and acts. The higher the temperature of any organised class of beings, the more perfect are they in all that relates to vital action. Organic sensibility and contractility—animal sensibility and contractility—are in immediate dependance on the temperature peculiar to each living being.

If the principles which have just been laid down be correct, it seems natural to conclude that the agent which presided over the formation and development of the living embryo, may not be without effect when applied to the functions or structure of that same being after its birth. Besides, if it be true that animal heat regulates the phenomena of nutrition, and all organic affinities, it is clearly necessary to keep that heat at a proper standard, in all cases where we desire to restore the functions just mentioned to a state of health.

The practical conclusions to be derived from the principles which have just been established, are the following:—The degree of heat peculiar to the human being is 96°. To the influence of this heat was the embryo submitted during gestation; by it were his organs developed, and his functions established.

In a state of health, the animal temperature is kept up to this standard; and during disorder or disease we must have recourse to the same degree of heat, in order to restore the functions to this natural condition. To maintain the requisite degree of artificial heat, air is the best medium. It may be applied locally, in a diffused manner, universally, constantly, or with intermissions. The necessary apparatus is very simple. It consists of a spirit lamp—of a metal tube, bent at right angles, to which the lamp is fixed, for the purpose of conveying the heated air—and of a wooden box or apparatus, in which the limb is placed.

Incubation* is the constant application of a temperature of 96° to a diseased portion of the body, or to the whole frame, in certain cases of constitutional disorder Experience teaches us that the degree of heat should never exceed 102°, or fall below 90°. The duration of the application must be regulated entirely by the severity of the disease, the effects of the remedy, &c. The manner in which incubation acts on disease now remains to

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* The term employed by M. Guyot.

be explained. The action is either local or general. The first, and most constant, local effect produced, is the speedy alleviation of pain. The next effect of the remedy is to disperse the redness which indicates the presence of inflammation or congestion. Finally, the tumefaction of the diseased parts, whether arising from inflammatory action or passive infiltration, almost invariably vanishes under the influence of increased temperature. In cases of ulcer, and simple wounds, the beneficial results produced by this mode of treatment are most remarkable. As soon as the surface of a sore or wound is submitted to the action of a temperature at 96°, it assumes a florid appearance, and the vital energies of the part are instantly aroused to increased activity. During the first two or three days, an abundant discharge of bloody serum, or thin pus, takes place; but this quickly subsides, and is replaced by the secretion of thick and very consistent purulent matter. The pus now concretes, and forms a firm scab, which covers the whole surface of the sore. Where the wound is a simple suppurating one, the nature and quantity of the discharge are rapidly brought back to the conditions most favourable to cicatrisation. In proof of the efficacy of incubation, when applied to the treatment of ulcers, M. Guyot relates in detail sixteen cases of this disease. In nine cases which had been regarded as incurable by other means, a perfect, solid cicatrix was obtained. In five cases, the sore was reduced from vast dimensions to a very

small extent; and in two cases only did the remedy fail. As examples, I have incorporated one or two of the most remarkable cases, given by M. Guyot, with my own. They afford incontestible evidence of the beneficial results arising from the application of heated air to ulcers—a principal ingredient, be it remarked, in my own method of treatment by fumigation.

The efficacy of sulphur in the treatment of diseases of the skin, was familiar to medical men at a very early period of the healing art; but, so far as I can learn, it was first brought into notice as a fumigative, by M. Galés, in 1816, who demonstrated the utility of sulphur fumigations in many obstinate diseases of the skin, in gout, rheumatism, and various other affections. M. Galés informs us that sulphurous gas is readily absorbed by the skin; it excites, at the same time, the perspiratory apparatus, giving rise to copious transpiration from the vessels of the skin. The sulphur fumes, likewise, give increased energy to the functions of the cellular tissue, stimulate the languid circulation, and modify, in a very remarkable degree, the functions of the lymphatic system. When a considerable portion of the body is exposed to the fumes of sulphur, in a closed box, the effects of this medicinal agent on the system at large are quickly manifested. The patient's face becomes red and animated; the eyes brilliant; the temporal arteries beat strongly; and the pulse is soon accelerated. When the patient is removed from the apparatus, we find the skin

of a deep red colour, with the papillæ remarkably developed. Should any open pustules or ulcerated spots exist on any portion of the body, we find them covered by large drops of viscid exudation, and the patches of scaly eruption are clothed with a delicate serous effusion of the same kind. The effects of the application on the functions are no less obvious. By exciting the skin, the sulphur fumes exercise a sympathetic influence on the digestive organs, and the patient's appetite is generally improved. They also act beneficially on the muscular system, increasing the strength, and giving not only the inclination, but the power, to enjoy protracted exercise.

The general or constitutional affections in which the remedial agent, iodine, has been successfully or unsuccessfully employed, are by no means few. In scrofula, syphilis, rheumatism, and a host of other diseases, this remedy has been thought by many practitioners to possess almost specific powers. I do not propose to consider in this place, whether such opinions be correct or fallacious; my object being solely to direct the attention of the Profession to its immediate application to local diseases and injuries, in which, previously to the appearance of my paper in the LANCET, in 1838, it had been but little, if at all, employed.

Since the publication of my views, I have lost no opportunity of increasing my knowledge on this subject. I have tested its remedial and curative powers—studied carefully

its action in a variety of local affections: and from an attentive observation of a considerable number of cases, I can unhesitatingly assert, that it deserves to rank as one of the most valuable and powerful agents in the whole range of the materia medica. But it is not of iodine alone that I have now to speak; it is of the combined influence of iodine, sulphur, and temperature, in the treatment of habitual ulcer of the lower extremities. The nature and extent of this influence will be the more readily understood after the description which I have just given of the effects produced by each remedy separately. The sulphur and iodine fumigation acts topically on the surface and substructure of the ulcer, and generally on every portion of the limb to which the gaseous or volatilised particles have access.

If the principles which I have endeavoured to establish in another part of this work be correct, it follows that ulceration arises from impaired vitality of a part, and alteration of its texture; and that we can only arrest the tendency to destructive ulceration, by increasing the vital energy, and improving the organisation. These two necessary indications for the cure of ulcer are fulfilled by fumigation, more rapidly, more completely, and more effectually, than by any other method.

Independently of the inherent virtues of the remedy, this superiority may depend partly on the impalpable form in which the materials are applied, and partly on the heated air, the medium through which they are conveyed. It is a

well-ascertained fact in therapeutics, that the more minutely any remedy can be divided, the more readily is it taken up by the absorbent vessels, to enter into the circulation, and act on the human economy. Hence the value of fumigation as a mode of applying remedial agents, in all cases where it is possible to have recourse to it. However this may be, certain is it that the sulphur and iodine fumigation possesses a power of arresting ulceration, and promoting the natural closure of sores far beyond that of strapping, bandaging, or any other mode of treatment hitherto employed. But we must not conclude from this, that the only thing the practitioner has to do is to place an ulcerated leg in the fumigating box for a certain number of times, and then take it out cured. Long-standing and obstinate diseases, like habitual ulcer of the lower extremity, cannot be disposed of in this cavalier manner. To master long-continued ulceration, the subject of the complaint must be both prudent and patient — the surgeon skilful and experienced, ready and able to avail himself of every secondary indication which may present. Thus, in many cases, I do not think it advisable to submit the patient at once to the treatment by fumigation, when the ulcer itself is extremely painful or inflamed, when the constitution of the patient, as often happens, has been shaken by excess—when the general health is evidently so much impaired that we can have little reasonable hope of applying any local treatment with success—in these and many other analogous cases, it is neces-

sary that certain preliminary measures should precede our specific mode of treatment. The inflammation, when severe, must be alleviated by appropriate means, especially by the application of moist vapour at a low temperature. For irritable ulcer, if we find the first attempt at fumigation too painful, we may employ a watery solution of opium, carefully filtered, to get rid of the resin of the gum; lotions containing a small quantity of nitrate of silver, the solid nitrate, or any other of those applications with which surgeons are but too familiar; and when the complication has been relieved, return to the fumigation. The disordered state of the general health which accompanies so many cases of ulcer amongst the inhabitants of this great metropolis, opposes a serious obstacle to the successful treatment of the local malady; and this from the difficulty of inducing the patient—whose moral habits are often as lax as his health is feeble—to submit to any restraint whatever. The most urgent remonstrance will frequently fail to induce men of this class either to take a week's rest, or to forego their accustomed enjoyments. The general vapour bath is often the only remedy which he will consent to adopt; and this, by improving the condition of the blood, while it increases the appetite, and soothes, in a most remarkable manner, general and local irritability, is an adjunct of very great importance and value.

During the course of the treatment by fumigation, the surgeon likewise will not neglect to avail himself of

the many auxiliary means the utility of which has been demonstrated by experience. In some cases, despite our care, fungous granulations will shoot up from different portions of the ulcer — an accident most likely to occur when the sore is very large and deep: it may also happen from the same circumstances that the contracting process goes on slowly, nature being unable to repair, in a brief period, the vast loss of substance: the condition of the limb, especially when it is the seat of extensive varicose swelling, may require support and rest in the horizontal position. The different complications just alluded to will demand the employment of appropriate means, in the intervals of fumigation. The nitrate of silver, the sulphate of zinc or copper, may be applied to the luxuriant granulations; to aid the natural process of contraction, straps of adhesive plaster may be applied, after the manner of Baynton or Scott. To relieve the loaded vessels, and assist the circulation, in cases of varicose veins, the roller may be employed with advantage, or the new form of elastic stocking called into requisition; whilst, in cases where the limb is much swollen, rest may be requisite. In a word, while placing our chief reliance on fumigation, as the mainspring of the treatment, we must avail ourselves of every secondary aid that offers; for it cannot be said of medicine, as of law, "*de minimis non curat.*"

Having very fully explained, at pp. 33, *et seq.* of this

treatise, the effects produced by fumigation on the surface of an ulcer, and on the tissues by which it is surrounded, there appears no necessity for my entering again on this part of the subject. Indeed, from reflecting on the separate properties of sulphur, iodine, and warm air, we might form a pretty correct idea of what their combined powers might be expected to effect. It is now many years since I first tested these powers, and my experience enables me to assert, that this new mode of treatment, where properly directed and perseveringly applied, is not only superior to any other with which I am acquainted, but absolutely capable of mastering, in a short time, almost any case of ulcer fairly submitted to it. In ulcers, especially those which occur in persons of strumous habit, and in many obstinate skin diseases, the rapidity with which it produces a beneficial change is truly astonishing. I have repeatedly seen some of the most obstinate cases of habitual ulcer—cases which had gone the round of the hospitals, and baffled the skill, while they exhausted the patience, of the most experienced practitioners,—yield in a surprisingly short period to the influence of fumigation.

This mode of applying sulphur and iodine seems to exert an influence at once profound and rapid on the organic nutrition of the part to which it is applied. One of its first and most visible effects is, to check the secretion of abnormal deposits from the inflamed capillaries, which are soon restored to their natural calibre, and to alter the morbid

disposition which gives rise to ulcerative absorption. It stimulates and increases the vital energy of the cells of the cellular tissue, and enables their blood-vessels to secrete an increased quantity of nutritive matter from the fluids which they convey, thus affording a considerable amount of new and healthy tissue in a short space of time. This effect is a remarkable one. It is certain that the formation of new tissue—induced by the topical application of a regulated temperature with the fumes of iodine and sulphur—takes place much more rapidly than from the action of any other agent; and this holds good of clean wounds, as well as of sores and losses of substance arising from disease. Thus, if a perfectly healthy individual becomes affected, in consequence of an accident, by any external lesion, producing loss of substance, the reparative process is perfected under the influence of fumigation, in a period of time considerably less than if the case were left to nature, or the ordinary means, such as poultices, strapping, nitrate of silver, or any other topical application, had been previously employed.

In conclusion, and briefly to sum up the principal effects of fumigation on habitual ulcers of the lower extremity, I may state that by this method:—

The tendency to ulcerative absorption is rapidly changed by a powerful impression made on the vitality of the affected part: in other words, the "bad habit" of the disease is broken.

The sensibility of the sore, and of the limb, is advan-

tageously modified, as the diminution and quick subsidence of all pain demonstrates.

The vessels of the part are as rapidly acted on, and instead of secreting pus, are stimulated to throw out a plastic secretion, which at once serves as a defence to the sore, and a nidus for the formation of healthy reparative tissue.

The inflammatory action, more or less of which constantly attends every species of ulcerative absorption, is soon subdued; and instead of the red, livid, and angry circle, which surrounds the sore, we speedily obtain the dull whitish margin, indicative of incipient cicatrisation.

The callous deposits on the edges of the ulcer—the irregular and morbid effusions which constitute its base—the yellow infiltration, which fills or disorganises the cellular tissue in the vicinity of the ulcer, and frequently that of the whole limb—all these are removed by the rapid absorption which fumigation excites.

This removal of morbid deposits not only enables nature to proceed more quickly to the completion of the reparative process, but renders the cure more permanent; for the tendency to relapse, under the old methods of treatment, depends on the cicatrisation having taken place over "unsound flesh."

The cure, therefore, is not only quick, but lasting.

In ordinary cases, the treatment is conducted without the necessity of confining the patient to the house, or even

to the horizontal position; and it is of a nature which involves neither suffering nor discomfort—neither loss of time to the patient, nor risk of reputation to the surgeon.

Finally, the invaluable influence of fumigation is not confined to cases of ulcer, but extends to every case of external disease connected with the deposit of morbid non-malignant products in the tissues of the human body.

Wherever the surgeon's object is to promote the absorption of such abnormal deposits, and restore the part to its natural and healthy organisation, the power of fumigation is all but irresistible.

ILLUSTRATIVE CASES.

HABITUAL ULCER OF THE LEG.

A. B., a printer, forty-four years of age, residing at ——, Strand, sent for me, January 22nd, 1838. The general health and conformation appear good, his muscular force is undiminished, and his appetite excellent. He has given up his employment six days; his appearance impresses one with the conviction that he is of a decidedly scrofulous habit; there is a scaly form of eruption on the right side of the face; he has the remains of a large cicatrix above the right wrist, and old indentations above the right elbow.

I found my patient in bed; there was a very offensive gangrenous smell upon entering the room. He complained of great pain in the calf of the left leg, which is the seat of an enormous and extremely irregular ulcer,* occupying nearly its middle surface; its transverse measurement is $4\frac{1}{2}$ inches, and $2\frac{3}{4}$ inches from above to below; the depth is various, in some points more than an inch. About the centre of the hollow of the wound is an irregular tongue, of dark tendinous structure; this slough, although moveable, cannot be detached without violence. Abortive attempts at granulations surround its edges; they are of the size of a split pea, or even larger, flabby, semitransparent, and lacerable on the slightest touch; these unhealthy points cover the whole of the floor of the ulcer; but, with the exception of those situated near the sloughing, and indeed gangrenous tendon of the gastrocnemius, they present their convex elevations from beneath a

* *Vide* Plate II, Fig. 1, 2.

pasty lardaceous exudation which covers them. Near the hardened and irregularly excavated edges of the ulcer, in one or two parts, are smaller and more compact granulations; these occupy detached sites, and are about the circumference of a sixpence.

My patient's history of his case was as follows:—Seventeen years since he laboured under and was cured of a bubo in the right groin; shortly after his recovery, and when apparently in the enjoyment of excellent health, a small yellow *vesicle* appeared on the inner side of his left leg; the skin being removed, an ulcer of the size of a pea was discovered; this increased rapidly, and at the end of three months was three inches in diameter. During this time *poultices* alone were applied, and small doses of mercury given. Little effect was produced by this treatment; the *external application* of mercury was had recourse to, and salivation ensued. The *ulcers*, for there was one at the back of the calf, of the same description, but not so large or deep, began to improve, poultices were discontinued, chalk dressings, strapping, and rolling followed, and at the expiration of three months more (making altogether six months), he was convalescent. On subsequent occasions the patient was treated for syphilis; pains in the joints and bones frequently attacked him.

Twelve years after the period first mentioned (five years since), small ulcers appeared about the head, with excruciating pains; these, being considered rheumatic, were allowed to take their course. A weakness and pain in the wrist now became very troublesome, accompanied by a small hard swelling, immediately above the joint; this gradually increasing, became inflamed and softened; it was opened, and the bone was found diseased; exfoliation took place, and the part healed. The period ran through eighteen months; the principal medicine taken was sarsaparilla, in large quantities; yet hard swellings persisted on the head; there were eruptions about the face, and small obstinate ulcers on the arm, of the same character as those on the leg.

In the month of March, 1837, a *pustule*, nearly an inch in diameter, appeared on the outer side of the left leg, to which he applied *poultices* by night and dressing by day. An *ulcer*, 1½ inch in diameter, rapidly developed itself; it had ragged edges, and a hard whitish substance, or core, in the centre. On application at one of the hospitals, he was ordered *poultice or dressing*, as best might agree, with occasional fumigations of cinnabar, taking at the same time specified doses of the hydriodate of potash; the ulcer had an improved appearance. In this

condition and under this treatment he continued about four months, when a small ulcer appeared on the right side of the leg. Poultices and lotions were applied, and the hydriodas potassæ continued; but the first-mentioned ulcer rapidly extended, and in the course of a short time presented a surface of alarming dimensions;—as the patient's expression was, he could see it eating its way.

My observations and treatment commence from January, 1838. The extremely irregular form of the ulcer rendered it difficult to adopt any mechanical application, while the surrounding tissues, in a state of rapid ulcerative absorption, could not be subjected to the necessary pressure, with the least prospect of success, or even safety.

An unhealthy livid tint surrounded the edges of both ulcers for some inches, threatening, in defiance of any means that might be employed, to involve the remaining structures in the ulcerative mischief. This dark tint is gradually blended with a brighter hue, which ceased at the ankle and dorsum of the foot. The pain is very excruciating.

The most important indication was, evidently, to check or arrest the rapidly spreading ulceration; and this I thought would best be fulfilled by the local application of a remedy, which previous experience had taught me to regard as being possessed of more power to subdue the inflammatory action, and change the diseased habit of the vessels and tissues of the part, than any remedial agent hitherto employed.

January 25, 1838. Having spent a couple of days in preparing an apparatus for fumigation, I ordered the following:—

℞ Sulph. Flor. ʒ ij.

Iodin. gr. x. M. Divide in pulv. sex. Utet. i. ter indies, secund. formulam.

January 28. The pain of the ulcers was much relieved; there was no longer any fætor; the congestion of the capillaries had evidently diminished, and the livid hue surrounding the edges of the sores had in a great degree disappeared.

℞ Sulph. Flor. ℥iss.

Iodin. gr. xxx. M. Ft. pulv. xij. Utet. i. ter indies.

Some of the granulations were now too exuberant, and to check them the following lotion was ordered.

℞ Zinci Sulph. gr. xx.

Alumen. gr. xx.

Aquæ, ℥ j.

Small strips of lint were applied three or four times a day, and oiled silk over all. An aperient was given to relieve the bowels.

February 3. The granulations were more compact and red; the dark sloughs at the bottom of the wound had begun to separate, and many were discharged. The edges of the ulcers were rapidly taking on a healthy action, and the floors were covered in several parts by small detached patches of lymph. The congested vessels of the limb were, as far as possible, emptied by position and strapping carefully applied from the toes to the knee, over which an elastic bandage was placed.

February 8. The patient has been perfectly free from pain for the last few days; a large proportion of both ulcers is now filled up; the sloughs are detached, and the offensive smell completely gone.

February 20. The period between the 8th and 20th has been chiefly employed in checking the too luxuriant granulations by astringents. The adhesive plaster was now removed, and the fumigations resumed twice a-day.

March 1. The circumference of the small ulcer (*vide* Plate 2, Fig. 1) is covered by a firm healthy skin, whilst the central cicatrix is completely concealed by a strong layer of coagulable lymph, everted round its circumference, and, as far as can be observed, cicatrisation is nearly perfect underneath.

Continue the powders, with an addition of iodine, and repress the redundant granulations, near the edges of the large ulcer, by a strong astringent lotion.

March 6. The case is progressing rapidly to a cure; the new skin, which has formed with extreme rapidity, is kept covered with strips of lint, saturated with a strong astringent lotion.

℞ Sulph. Flor. ʒiss.
Iodin. ϑiij. M. Divide in chart. xij, ter. quaterve utend.

March 19. Rapidly improving. Repeat the fumigation.

March 25. The smaller ulcer is perfectly healed; of the larger nothing remains, except a central spot, about the size of a shilling, and having a perfectly healthy appearance. Over this is attached a thin adherent scab, whose everted edges I ordered the patient to remove carefully with a scissars, and cautioned him not to return to his business (night employment, &c., on a morning paper) until the central

cicatrix of the large ulcer was perfectly obtained, and also to continue to visit me from time to time during the succeeding fortnight.

This he failed to do; the consequence was, that ulcerative absorption recommenced, and in August of the same year he again applied for my assistance. The sore was now of an enormous size, measuring $6\frac{1}{2}$ inches transversely, and 4 inches from above downwards.* There were also two smaller ulcerations† close to the larger one. Fumigation was again resorted to; the engraved outline (Plate V. Fig. 1) represents correctly the size of the ulcer after twenty-seven days' treatment; the outline Fig. 1 of Plate VI, shews the size after fifty-four days' treatment.

From this period contraction proceeded rapidly, and the enormous sore was healed completely and permanently, at the termination of three months.

REMARKS.

This was one of the first cases in which fumigation was methodically employed, and the result was such as to excite expectations, which I rejoice to say have not been subsequently disappointed. Whether we regard the constitution of the patient, or the nature and appearance of the enormous sore by which he was afflicted, the case, it must be confessed, was anything but a promising one. The patient had been more or less ill for seventeen years, occasionally suffering under symptoms that partook of a syphilitic character.

The ulcer for which he came under my care was of nine months' standing, and had resisted every mode of cure suggested by the medical officers of our most celebrated hospitals. To go over the beaten track again were not

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* See Plate I, Fig. 1. † See Plate I, Figs. 2 and 3.

only unfair, but cruel: it was therefore resolved that we should give a fair trial to the fumigation, although the apparatus employed at that time was anything but perfect. Notwithstanding the painful, and even gangrenous state of the sore, the first fumigations were borne even better than could have been expected; while the beneficial results produced were quickly manifest. On the second day, the exquisite pain of the sore was much abated; and on the third day, the special effects of the fume were visible; the livid and angry edge round the ulcer had assumed a more healthy appearance, while the absorbents had removed a considerable portion of the deposits on which the unhealthy condition and irregular size of the limb depended. Where so large a portion of the groundwork of the ulcer was gangrenous, it was of course impossible to expect any attempt at reparation until the sloughs were removed: when this took place, the reparative process commenced, under the influence of the fume, and within twenty days was effected the cure of as ugly and extensive a sore as could well fall under the treatment of any practitioner. I am happy to say that, up to the present moment, the patient has not suffered a relapse. The cure was not only rapid, but permanent; and the permanency I attribute chiefly to the effect of the fumigation, in removing the morbid deposits which serve as a nidus for ulcer, and whose existence is a constant predisposing cause of ulcerative absorption.

From the commencement of the treatment to its successful issue, tonics and aperients were occasionally employed. I may add, that the case was seen during the treatment, by Dr. Hennis Green and Dr. Burgess, who expressed their satisfaction at the rapid and in every way satisfactory results of the fumigations.

LONG-STANDING LEPRA.—ULCERS OF LEG.

Mr. Clapp, engraver, 111 High Holborn, aged thirty-six, middle stature, possessed of great energy of character, and application to business, was, in the year 1819, in consequence (he thinks) of drinking cold water, whilst much heated, after a long walk, attacked by an eruption, which extended nearly over the whole of the body. He was advised to take some antiscorbutic drops,* of which he says he had an amazing quantity. At this period (eighteen years since), his upper limbs were covered with the orbicular convex patches of lepra, extending to the fingers; every nail was involved in the mischief, and lost in quick succession. His health was now so seriously deteriorated, that he was compelled to walk with sticks for a considerable time. From the above period until now, eighteen years, the disease has persisted, more or less, over the whole body. His general health has been very good *since he arrived at manhood*, and his appetite excellent, more especially for red meats. The anxieties inseparable from the support of a somewhat delicate wife and a young family, have urged him, perhaps, to too diligent application to his business, as a map and writing engraver, and he has always noticed that as he has been compelled to make excessive exertions, and steal hours for business that ought to have been given up to sleep, his symptoms have been proportionately aggravated.

In the early part of October, 1837, his legs were so seriously affected that he could stand only for a few minutes at a time; their entire surface was discharging a *thin matter*, and excessively painful; he applied poultices of linseed meal, which seemed to encourage the formation of a matter of a creamy consistence.

Corrosive sublimate, two drachms; gentian root, dried orange peel, of each two drachms; crude antimony, red Saunders wood, of each one drachm; spirits of wine, water, of each eight ounces.

November 12th I was sent for; I found my patient with little constitutional disturbance; his tongue clean; appetite good; pulse 70, but without power; the bowels regular. He was extremely depressed in mind from a conviction that he should never again be able to indulge his taste for walking, so necessary in his business, so essential to his pleasures. When I saw him he had been confined to bed six weeks, and had been incapable of following his employment during that time, —his pressing business engagements he was most anxious to fulfil, yet was unable to do so.

External appearances.—The head, ears, more particularly the lobe of the left ear, are covered by a small, orbicular, furfuraceous scab; the anterior and posterior parts of the chest, back, and abdomen, are studded with leprous scales. In the upper extremities the scales are larger, more detached at their circumference, and surrounding chiefly the joints of the elbows; there are patches here and there, having a more inflamed margin than others; in the neighbourhood of the joints the incrustations are thicker and more convex in their centre; when detached from the central pedicle a moisture attaches to the finger from the surface they have left. In the lower extremities the disease assumes a more desperate character, probably in consequence of the incumbent column of fluids and the venous retardation; the thick and indurated incrustations vary from the size of a sixpence to upwards of a crown-piece, or even larger; the right leg is literally encased in a sheath of these morbid growths, a few places excepted. Where the circumference of the scales is not in contact, exuding from between is a matter of the consistence of cream, of a light slate colour. These scales are irregularly detached, and as certainly rapidly re-produced. In various parts of both legs are perforations of the skin, which discharge portions of cellular tissue; the ulceration extends around the inner and outer ankle of the right leg, over the dorsum of the foot, which, even to the extremity, and between the toes, is completely denuded, so as to make me apprehensive that they will become adherent; in this situation he complains of great pain. Both legs present an highly inflamed appearance, the right more particularly. From just below the tuberosity of the tibia, and extending to the lower edge of the popliteal space posteriorly,* surrounding the whole limb downwards to the extremity

* The flexion and extension of the joint are much impeded.

of the toes, there is a mass of scaly eruption, with diseased subjacent structures, occasional ulcerated large and small surfaces, and discharge of thick offensive pus, which I have seen the patient sweep off with his hands, without effort, in disgusting quantity.

From the 13th to the 27th of November, the patient was submitted to mercurial alteratives, with the hydriodate of potass in a tonic mixture.

November 27. There is no appreciable amendment; the scales are detached in great numbers, but reproduced in quick succession; the matter is of the same consistence, but of a more dirty tint; his appetite is very good; bowels confined. Let an aperient dose be taken. He complains of extreme pain in both legs, the left more particularly; has made up his mind to continue in bed; the discharge is so profuse that it saturates everything it comes in contact with; there is no apparent amendment in the upper portions of the body.

November 29. Repeat the tonic mixture. Repeat the pills, two in the evening, one in the morning.

November 30. Repeat mixture, ℥iss. four times a day.

December 1. Repeat mixture and lotion.

December 2. He complains of intolerable pain in both legs.

℞ Opium, ʒ ij.

Boiling water, Oij. Infuse six hours, filter twice, add—

Oxide of zinc, ℥ss.

Starch, ʒiij. Make a lotion, use as before.

December 3. Repeat mixture of hyriodate of potass, thrice a day.

December 5. Repeat opium lotion; compound jalap powder, ʒss. Complains of intolerable pain; the lotion does not appear to relieve him; the lint is completely dry in from twenty minutes to half an hour after it is applied; he says it gives him much pain in its removal for the purpose of wetting it with the lotion: ordered to allow it to remain, and to apply freshly saturated portions as often as the others are nearly dry.

December 6. ℞ Comp. decoct. of sarsa, lb. i.

Hyd. potass. ʒ ss. A spoonful thrice a day.

December 8. Repeat lotion and mixture. There is less redness about the circumference of the scales on the trunk and upper extremities: they detach very freely, leaving a more healthy skin be-

neath; appetite is excellent; his legs have been kept in position so as to favour the return of the fluids. Every morning quantities of scales are swept out of the bed; he sleeps little.

From this period up to the 19th, the decoction of sarsaparilla with hydriodate of potass was administered, and the opiate lotion applied to the painful surfaces of the limbs.

19. The patient has passed a very restless night; the discharge from both legs is excessive; portions of sloughing cellular tissue are detached, mixed with pus and scales, which are thrown off and reproduced in amazingly quick succession. Many of the scales are larger than a crown piece, and very hard; these are evidently a source of great irritation to the subjacent tissues.

To have a calomel and opium pill every night.

Things continued in this state to the 2nd of January, 1839, when the sulphur and iodine fumigations were commenced. It is right to observe, that the liquor arsenicalis had been given with the other internal remedies, but symptoms occurred at this period which compelled me to suspend its use, and in a few days afterwards I omitted it entirely.

January 3. There are no remains of disease on any portion of the body, with the exception of the lower limbs, and they are, I am convinced, after a minute observation for some days past, in a worse condition than at the commencement of the treatment. The entire surface discharges a thick slate-coloured matter, particularly offensive in smell. The tension of the cutaneous tissue persists; the dermic indentation is very evident on most of the scales; on some of the more ancient patches are deep fissures, or slighter lines on the superior surface. To-day, with a slight effort, I have removed several large orbicular patches of this character; the cutaneous surface beneath is of a highly inflamed dull copper colour. There are innumerable minute points of ulceration, some superficial, others of great depth. There are portions of sloughing cellular tissue, partly blocking up many of these excavations. Lower down the limbs, more especially laterally and posteriorly, are large and deeply excavated ulcerations; two of them are two inches in diameter; the pain is of an extremely severe character; anodynes afford very little relief. Such is the intense inflammatory action, that I have seen a well saturated piece of lint applied on any portion of either limb completely dry in ten

minutes; the removal of this dry portion was subsequently not attempted, but other saturated portions added as required. The nails of the right foot were now rapidly taking on the diseased action; the dorsum was studded with ulcerated points, discharging an extremely irritating fluid. Here, and above the outer side of the left ankle, he complains of the most intolerable pain.

It may be observed, that during the whole period occupied in the treatment (and before the employment of the *external medication*) the scales on the lower extremities were gradually increasing in thickness and size, and *that in one week* after this treatment was determined upon, the appearance of the remaining ones was completely changed, by being converted *into a thin laminated scale*, and their being reduced to less than a third of their previous size.

January 26. He has followed his occupation from the fourth day of the employment of the vapour treatment, and walked in the interim many miles, and has been compelled to keep his legs in the dependent position. There are four or five large unsightly cicatrices remaining, but the ulcers they cover are healed. The pain has entirely left its former site, and he says he walks as well as ever.

REMARKS.

The predisposing and exciting circumstances connected with this case, the alarming condition of the whole of the lower limbs, when the treatment was undertaken, the persistence of the discharge, the rapidly extending ulceration, involving not only the skin, but the muscular and connecting tissues, to considerable depth; the extreme pain, which anodynes only slightly, or not at all, relieved, the inefficacy of the remedies employed—these, and other considerations, seem to justify the conclusion that no remedy, or combination of remedies, is capable of producing the rapid and satisfactory results of fumigation.

There was present great physical suffering, with extreme mental depression. The patient frequently despondingly observed, that he "should never march again." The subject of a confessedly intractable disease, aggravated by neglect, increased in its severity and prolonged in its duration by unfortunate circumstances, pressing with accumulating daily weight their victim to the earth, had little to cheer, or stimulate him to increased resistance, when he found that what to him appeared well directed efforts for his relief, seemed to be worse than useless,—that the disease even increased under remedies. Reasoning from analogy, I believed it my duty to make further efforts; the necessity for the employment of a more *energetic external agent* struck me forcibly; I knew that it was *perfectly safe* in its application; readily employed, easily combined, and, as I had hoped, it proved I had not mistaken its power. The relief was immediate; from the first application a change was perceptible. I shall not readily forget his expressions of gratitude, when, on calling upon him on the fifth day of this new treatment, he told me with tears in his eyes, "that he almost believed it impossible, yet it was true he had walked twelve miles the day previous;" he had been enabled "to look up his customers;" that "he was sure he should in a few days be enabled to walk as well as ever;" nor has he been wrong in his opinion.

ULCER OF THE LEG.

Mr. John Slater, residing at 25 Union-street, Middlesex Hospital, came under my care on the 2nd of April, 1845. About fourteen months previously, the patient observed a small spot or pimple on the inner ancle of the left leg, which he attributed to wearing an incommodious slipper. He rubbed the pimple off, and it was immediately followed by a painful ulcer, of the size of a fourpenny-piece.

He first tried some remedies himself, and, those failing to arrest the progress of the ulcer, he applied to a surgeon, under whose treatment he continued for twelve months. A great variety of means was employed by this gentleman, without success. The ulcer remained intractable; a second sore formed; and the pain which attended it was of a very severe and exhausting character. The patient now transferred himself to the care of another surgeon, under whom he remained for two months, but with similar want of success. Having heard, through a friend, of some of the results of my treatment, the patient resolved on giving a trial to the new method, by which he was perfectly cured. This case was seen during the treatment by Dr. E. Johnson.

The two following cases have been communicated to me by my late pupil, Mr. C. J. Newstead, surgeon, of Brighouse, Yorkshire.

ULCER AFTER INJURY.

John Chadwick, forty-five years of age, by occupation a worker in stone, a man of gouty habit of body, was wounded on the 11th of April, 1845, on the right leg, by a mass of stone, which fell from a height on the limb.

The wound extended obliquely across the lower part of the tibia and fibula, and penetrated the periosteum, a portion of which was abraded. The wound had been completely healed on the 18th of June, when, from some cause which could not be ascertained, ulceration set in over the seat of the original injury.

The progress of this ulceration, attacking, as it did, the newly-formed and weak structure of the original wound, was very rapid, and the appearance of the sore led me to think that nothing but the fumigations which I had seen so successfully employed by Mr. Walker, could arrest its destructive action. I therefore had recourse at once to

the sulphur and iodine fumigations, which I continued until the 7th of July. Under their use, the aspect of the sore soon improved, ulceration was arrested, and, on employing some stimulant applications, together with support, I obtained perfect cicatrisation in a few days.

VARICOSE ULCER.

Mary Drake, a woman fifty years of age, applied for my assistance on the 25th of October, 1845.

This poor woman had laboured under varicose ulcer of the lower extremity for fifteen years. During this period, every form of treatment that ingenuity or experience could suggest, was had recourse to, but without effect; and the patient, in despair, placed herself in the hands of different quacks, but with a like result. From the 25th of October to the 24th of November, I employed the fumigations without intermission. By the middle of November, the appearance of the ulcer had been much improved, and the condition of the whole limb evidently ameliorated.

From this time healing commenced, and at the end of the month I had the pleasure of seeing that the treatment had completely mastered this obstinate and severe disease. The only auxiliaries employed were the laced stocking, and, occasionally, stimulants.

ULCER CURED BY HEAT.*

A locksmith, named Bridot, thirty-nine years of age, was admitted into the Hôtel-Dieu, on the 16th of December, with two ulcers, situate on and over the inner ankle of the left foot. Up to the 24th of December, they were treated by compression without any benefit.

The patient was then transferred to another ward, to be treated by heat. The lower ulcer, of an irregular horse-shoe shape, covered a portion of the ankle, and was 32 lines† long by 8 broad; the other was about 8 to 10 lines both ways. Twenty-four hours after the application of the apparatus, the ulcers were completely covered by a thin transparent effusion, underneath which could be seen the rosy surface of the sore; on the inner edge of the large ulcer, however, there was a whitish spot, indicating the existence of suppuration. At the expiration of forty-eight hours more, the scabs were removed; they were thin and transparent, and underneath them had formed a beautiful thin pellicle

* From Guyot, l. c., p. 78. † A line is 1-10th of an inch.

of perfect cicatrix. The only point not healed was the white surface already alluded to; but this was not larger than one's nail. During the next two days a scab formed here, but there was always a little suppuration under it. After one or two relapses, arising from the carelessness of the patient, the intractable portion of the ulcer was completely healed on the 20th of January.

ULCER CURED BY HEAT.*

Madame L—, a lady from thirty-five to forty years of age, of scrofulous constitution, burned her left leg slightly, just above the outer ankle; the veins of the limb were varicosed, but not to any considerable degree. The ulcer which succeeded the burn was treated with various remedies, but unsuccessfully. When submitted to the action of heat, it was $2\frac{1}{2}$ inches long by $2\frac{1}{4}$ inches broad; it was of a dirty grey colour; its edges sharp and elevated; the surface was extremely painful, inflamed, and it secreted a great quantity of reddish sero-purulent matter. The apparatus was applied on the 29th of July, at three o'clock, p.m. The next morning, all trace of inflammation and pain had disappeared. On the third day, the formation of a cicatrix commenced; a small scab covered the whole surface of the sore, and this was removed every third or fourth day. On the 11th day, the extent of the ulcer was reduced to 14 lines by 10; on the 14th day, to 6 lines by 4. The surrounding cicatrix was now firm, and all trace of suppuration had disappeared. On the 16th day, nothing more could be seen than a small moist point in the centre of the sore: this was soon covered by a dry scab, which was removed on the 22nd day, when the whole surface was found to be completely healed: since then the patient has never suffered any relapse.

M. Gales, in his work on the efficacy of sulphurous fumigations in diseases of the skin, gives the following example of the benefit derived from fumigation in a case of ulcer of the leg:—

ULCER TREATED BY SULPHUR FUMIGATION.

S., 26 years of age, a porter by trade, of robust constitution, had

* Guyot, l. c.

suffered during the last ten years from ulcers in the right leg, for which he had been treated unsuccessfully in several of the Parisian hospitals.

On the 17th of September, 1814, he was admitted into the Hospital of St. Louis: the patient's face presented a bilious, unhealthy aspect; gums red, soft, and swollen; general lassitude, with loss of appetite and sleep; is much oppressed in spirits; the left leg is twice as large as in the natural state, and the whole of the integuments are of a purplish colour; in some parts the skin is hard and knotted; other portions are covered by several small ulcers, which discharge a thin and highly irritating serum. In addition to these are three large ulcers; one, deep, and excavated to the depth of three-quarters of an inch, with jagged and unhealthy-looking edges, occupies the inner ancle of the left leg; it is surrounded by a deep-coloured inflammatory circle, and furnishes a reddish fœtid discharge; the whole extremity is painful.

The patient was ordered to have a nourishing diet, with bitters, and the sulphur fumigations. On the sixth application, the ulcers presented a clean and more healthy appearance, and the tumefaction of the limb had partially subsided. The pain had disappeared, but was replaced by an intolerable sensation of itching, which was relieved by emollient poultices. On the eighteenth application of the sulphur fume, the leg was restored to its natural size; but the purple tint of the skin still remained. After the twenty-sixth fumigation, all the sores (with the exception of that on the inner ancle) were healed. The skin of the leg had a wrinkled appearance, and was now of a natural colour. On the fifty-second fumigation, the last-named ulcer was completely healed, and the cure has been permanent, although the patient, from the nature of his occupation, is compelled to undertake the most severe labour.

PILES.

Mr. W—, aged 32, residing in my neighbourhood, had suffered severely from a large excrescence occupying the right side of the anus.

It was the size of a small walnut, and might be defined to be an old hæmorrhoid, covered by true skin. It was extremely hard, slightly moveable, and attached by a broad base. He complains of acute pain upon pressure, and feels unwilling to alter the recumbent position he has chosen, as he found that any attempt at progression gave him great pain.

July 5, 1838. Let the fumigation be employed, in the following proportions:—

℞ Iodin. gr. xviij.

P. Sulph. ʒ vj. M. Ft. pulv. vj.

July 6. The patient informed me that he had employed three powders, with the greatest possible benefit. The pain was relieved almost instantly. He expressed the greatest gratitude.

A few days afterwards he assured me that the swelling, that had been such a source of annoyance and suffering, had almost disappeared.

PILES.

Mr. C—, aged forty-two, applied to me July 30, 1838. He had been under medical treatment at various times, for an hæmorrhoidal affection of a very troublesome and painful character, accompanied at intervals with muco-purulent discharge of a most irritating nature frequently mixed with, and at periods accompanied by, a considerable discharge of blood.

There were four tumours, two of which had broad bases; the others were attached by a small pedicle. The pain was very great. He was compelled to walk much, and whilst in motion suffered less than when he attempted to sit down. He had not slept during the previous eight nights.

Let the fumigation be employed.

July 31. During the past night he had eight hours' sound and refreshing sleep. The pain had almost left him. He had walked to my house with comparative ease.

Within a period of seven days from the commencement of the treatment, not a vestige of the tumours remained.

The relief afforded was as immediate, and as permanent, as in the preceding cases.

REMARKS.

The rapid effects produced by fumigation on the callous edges of ulcers, and on the deposits in the cellular tissue surrounding them, naturally induced me to try the same powerful agent in other affections accompanied by morbid

deposit.' The above cases of piles prove that my anticipations were not unfounded.

In hæmorrhoidal affections, we have tumour arising partly from distension of the veins, and partly from effusion of the lymph into the cellular tissue, from the irritated or inflamed vessels. Vulgar experience has taught many the benefit arising from warm vapour, which is permitted to ascend from a pan, and often gives speedy relief. But the power of iodine fumigations to excite rapid absorption is incomparably greater; and I feel no doubt but that this method, when properly appreciated, will be universally applied to the cure of a painful and troublesome malady, which without it can only be eradicated by ligature, or by the knife. Nothing is more simple or easy of application—nothing more certain or effectual.

TUMOURS ABOUT ANUS.

Mrs. — applied to me on the 4th of March, 1838. She stated that, nine months previously, she had suffered severely from ulceration, accompanied with gonorrhœal discharge,—and that her husband was still in a very diseased condition. She complained that she had not slept for the past eight nights, in consequence of the severe pain she had endured. She experiences great difficulty in walking. On examination, I found that she had six irregularly lobulated and indurated excrescences occupying the mucous edge of the anus, and extending for several lines beyond it: there was also ulceration of a syphylitic character, extending around the same part, occupying chiefly the posterior commissure.

She had been during the past nine months under medical treatment, and had derived no benefit. A great variety of applications had been made to the diseased surface, but the ulcerations persisted, and the pain had not been relieved. The discharge had for some time past been absent.

Prescribed the following :

℞ P. Sulph. ʒvj.

Hyd. Bisulph. ʒj.

Iodin. ϑj. M. ft. pulv. xij, ter. in die utend. ex fumigatione.

March. 5. She reported that after the first powder had been used she felt instant relief. She slept soundly during the whole night. The pain is of a very different character from that she had endured during the previous nine months. She walks "almost as well as she ever did," and can sit down with comparative ease.

March 8. She is quite well. The ulcers are healed, and the indurations are reduced to mere shreds.

I have repeatedly seen my patient, and occasionally prescribed for her since the above period. A few weeks ago (September, 1843), she again expressed to me her great gratitude for the instant relief she had experienced, and the permanency of the cure.

ULCER OVER THE ANKLE.

The following case has been communicated to me by Dr. E. Johnson, 42 Carnaby-street :—

"Mrs. Smith, a woman of spare habit, but good constitution, came under my care in the month of July, 1846.

"About 30 years ago the patient had an attack of erysipelas in the left leg, the ultimate effect of which was to occasion considerable induration of the tissues of the limb, in consequence of fibrinous deposits in the subcutaneous tissue. The veins of the leg also became varicose about the same time. Fifteen years after the period above named, she had a second attack of erysipelas in the same leg, followed by a very small ulcer, just above, and in front of the left ankle. The sore gradually increased to the size of a half-crown; the patient had the first surgical advice for two years and a-half, up to February last; the ulcer was occasionally healed, but as often broke out again. In April the patient had a slight febrile attack, when the inflammatory action extended up the leg, and the skin over the external malleolus of the same leg gave way ; the ulcer soon acquired a large size, being four inches in the perpendicular and two inches in the transverse diameter. The treatment adopted during this latter period was poulticing with bread and water, and rest.

"In the early part of July, 1846, Mrs. Smith came under my care. I ordered constant rest in the horizontal posture, water dressing, and occasionally touched the surface of the sore with nitrate of silver. The inflammation and extent of the ulcer were increased by this treatment. When the former had somewhat subsided, I applied strapping and a moderately tight bandage; but the pain produced was so severe that I found it necessary to remove them in a couple of days. Mild unctuous dressings were next employed, but the sore showed no disposition to heal; its surface was irregular, and covered with a thin ichorous discharge: the edges were everted and uneven; the skin, to the extent of six inches above the ulcer, was much inflamed, and indurated; the veins were varicose.

"On the 15th October I resolved on having recourse to fumigation, directed the following powder to be used twice a-day:—

℞. Iodin. gr. ij.
Hydr. Bisulph. gr. vj.
Sulph. ʒ ss.

"During the first three or four days the patient experienced a little pain from the fumigation, but this soon ceased. As the process was continued, I remarked that the surface of the ulcer became dry; the edges white; and that the surrounding inflammation and hardness rapidly diminished. This improvement encouraged me to continue with perseverance, and in three weeks the ulcer was completely healed. In addition to this the skin and subcutaneous tissues of the leg were much softened and improved in condition."

INVETERATE ULCERS OF THE LEGS.

A. Z., aged 52, of robust constitution, was attacked by cholera in the year 1832. His legs during the attack were rubbed with a stimulating embrocation, which produced abrasions of the skin of both legs near the ankles. Four ulcers, which rapidly increased in size, were the consequence of these abrasions. Two years afterwards he became an out-patient of an hospital, when the ulcers were healed after an attendance of three months.

Six years subsequently, some vesicles which soon afterwards broke, appeared over the site of the old ulcerations—which had slowly increased in size and depth up to the period of his placing himself under my care. He had during the previous three months been under the treatment of

an eminent surgeon from whom he obtained relief, but only a small approximation towards a cure. The gentleman gave up the case.

He now tried various practitioners in succession with no benefit.

Subsequently he used the "greasing system," under which he became much worse.

His sufferings during many years were so acute that he often desired death in exchange. Such was the sensation of intense heat of both legs, that for many years even in the coldest winter nights, he placed them out of bed in order to obtain relief.

The size and appearances of three of the ulcers are represented in Plate iii, Fig. 1, 2, 4. Nothing could be more discouraging than their aspect. Occupying the outer and inner ankle of the left leg, their situation was most unpromising. Deeply excavated, with thickened, blue, and everted edges, they were covered with a pasty lardaceous exudation. The surrounding tissues, half-way up the swollen limbs, were indurated and of a deep mulberry tint. These ulcers, seated in the midst of diseased materials, offered difficulties that had mastered every other form of treatment. The fumigation effected a slow but evident alteration and improvement both in the diseased tissues and the ulcers. Degree by degree the latter took on a healthy action, and my patient was ultimately cured. So beautifully was the modelling process completed, that now, although the site of the ulcerations may be perceived, no cicatrices are visible. The diseased tissues have been replaced by more healthy deposits, whilst the deep mulberry coloured tint of the tegumentary covering has been succeeded by a light copper-coloured stain.

LARGE AND IRREGULAR ULCER OF THE UPPER AND OUTER PORTION OF THE LEG.

Mr. Fencock, dairyman, White Hart-street, Drury-lane, had suffered upwards of two years from an ulcer of an irregular form which previous treatment had not subdued (see Plate iv., Fig. 1). The floor of the ulcer is covered with weak and irregular granulations —dotting, more especially, the superficial portions of its base, which in some places is deeply excavated, and covered with a dirty slate-coloured, tenacious exudation. The edges of the sore are excavated, everted, and of blueish tint. The fumigation was commenced on the 31st December, 1838. In a few days the entire aspect of the sore was

changed, and a painful, obstinate, and offensive ulceration, that during the two previous years had been a source of great annoyance and discomfort, was on the 6th of the succeeding January so far subdued, that before the end of the month it was completely healed.

EXTENSIVE ULCER OF THE LEG.

Mr. John Fabb, bricklayer, Little Queen-street, Lincoln's-inn-fields, came under my care on the 13th of May, 1838.

The history of the patient's case was as follows:—On the 16th of September, 1830, he received a severe blow on both legs, over the tibiæ, from the falling of a scaffold pole, from a considerable height. He was confined to his room for sixteen weeks in consequence of the injury, which was followed by ulceration in the seat of the wounds. From the period above named up to the present time, he has undergone a variety of medicinal treatment with little success. He was five years under the care of one practitioner, during which time he took considerable quantities of medicine—while various external applications, such as lotions, ointments, &c., were made to the injured parts. Strapping, also, was employed for two or three years. He states that for the same period he has scarcely had one good night's rest, in consequence of the pain, which shoots up from the ulcerated surface, to the inner condyle of the femur, over which the distended saphena vein projects.

He has frequently been obliged to remove the roller and strapping to get rid of this distressing pain, and then occasionally found that small ulcerated spots had "broken out" in the neighbourhood of the original sore—the result, as he imagined, of "the plaister sticking too closely." Under the strapping and bandaging plan he was sometimes surprised to find that the surfaces which it had taken many weeks to repair, had been suddenly removed; and, to use his own words, "all had to be done over again." The ulcer on the left leg, he says, he cured himself with soap and brown sugar. The one on the right leg was never perfectly healed by any treatment. It is situated immediately over the centre of the right tibia, and measures one inch and a-quarter in breadth, by three-quarters in height. It is surrounded by an inflammatory circle of a deep copper colour to the extent of several inches, with considerable induration of the subjacent cellular tissues.

Having improved the general health of the patient by the administration of alterative and tonic medicines, I commenced the fumigations on the 13th of May, and continued them, without intermission, until the complete cicatrisation of the sore. The pain was quickly relieved, and the process of contraction with filling up of the cavity of the ulcer so rapid, that the sore was reduced to less than one-half of its original size on the 26th of May, when its various dimensions were ascertained by careful measurement.

From this period the improvement continued, and on the 8th of July following the ulcer was completely cicatrised. The effects of the fumigation on the surrounding tissues were likewise most satisfactory. The injection of the cutaneous tissue immediately enclosing the cicatrix had nearly disappeared; while the tissues at a greater distance had become soft, pliant, and natural to the feel.

NUMEROUS ULCERS OF BOTH LEGS.

John Tucker, aged 52; a biscuit-baker, residing at No. 10 Rose-street, King-street, Covent-garden, applied to me on September 12th, 1843.

There were six large ulcers situated on the right leg, and seven on the left. Those on the right leg, more especially, had an irregular jagged appearance; the edges were blue (see Plate iv. Fig. 2, 3, 4), everted, and thickened. They exuded an unhealthy, offensive, sanious discharge. It was evident, from the history of the case, and the appearance of the ulcers, that no reparative action could be established unless a very decided impression should be made on the diseased tissues in which they had been so long located.

The legs were much swollen, very red, hot, and extremely painful—indeed, so severe have been his sufferings, that, during many years, he has not had a night's uninterrupted sleep. Of the seven ulcers situated on the left leg, one occupied either ankle; a larger one was seated in the centre of the calf; and of the four others, there were three situated in the line of, and the other outside and just below the centre of, the tibia. The smallest of the above ulcers was capable of receiving a large sized walnut. Nothing could be more discouraging than the appearance of the two legs:—enormously swollen, of a deep copper-coloured tint—covered with thirteen large ulcers—having bases deeply excavated—with hard, thickened, elevated and everted edges—they

were surrounded by, and seated in, tissues that had been, during fifteen years, the subjects of chronic inflammation, interstitial depositions—and consequent derangement of structure and function.

Tucker, at the commencement of his affliction had been an in-patient in various metropolitan hospitals during many weeks at different periods. He left them uncured, and, indeed, little benefited. The treatment pursued was of the old character—consisting of linseed-meal poultices and greasy applications.

Deriving little benefit from the treatment of regular practitioners—of whom he had esssayed the most talented, as report assured him—he sought from time to time the advice and assistance of male and female "Doctors" and "Doctresses." He was under the care of a person of the latter class, well-known at Stratford, Essex. Unfortunately his six months "doctoring" left him as it found him, unbenefited. He now placed himself under the care of a "Doctor" at Paddington. This professor of the healing art had been a soldier:—a professed wound maker—had turned wound curer—but the "Doctor" found, that wounds were more easily made than cured, and thus thought the patient, who after a three months' trial of his professional skill in this new line of business left him in his unimproved condition to seek the advice of a surgeon in the Mile-end-road, who succeeded in the space of four months in effecting a cure of both legs; but the cure was not permanent—within six weeks the ulcerative process re-commenced, and in a few days re-established itself in all its former activity, and was accompanied with the most acute suffering. After pursuing the above described round of regular and irregular practice, during several years, in the year 1835 he came under the treatment of a surgeon connected with a London hospital, under whose care he remained as an in and out-patient three years and a-half. During two years and a-half of this period he was unable to walk without the use of crutches. Up to the time when he consulted me, he had suffered much. Unfortunately his rest was utterly insufficient to recruit his strength. I was shocked and surprised to hear, that so much and such incessant exertion should be exacted from a man (in return for a recompense far too small) whose labours were so necessary to the community.

With an impaired constitution, partly induced by almost incredible labour, and an utter absence of sleep sufficiently prolonged, and with the condition of limbs above described, I undertook this poor man's cure.

Within ten days after the use of the fumigations the varicose condition of the veins is considerably improved.

Within eleven weeks the ulcers are healed, no cicatrises being perceptible. He assures me that he has experienced more relief from pain after the first fourteen days use of the vapour than he had done during the previous eight years.

Tucker at the date of the publication of this work informs me that his legs are in a sound condition, and that he can now walk almost any distance without the least pain.

ULCER WITH REMARKABLE CHANGES IN THE LIMB.

Miss Chambers, aged about 18, of lymphatic temperament, residing at Mr. Norman's, 70 Drury-lane, suffered during many years from a most painful and incurable ulcer on the leg. In the year 1834, she first noticed a diffused redness on the centre of the right leg. Shortly afterwards a small elevation (vesicular) appeared, which was attributed to the fatigue and exposure consequent upon standing several hours to view the conflagration of the Houses of Parliament. In a few days the vesicle burst, and was succeeded by an extremely painful ulcer of a superficial character and about the size of a pea.

The ulcer having rapidly increased in size, Miss C. sought the assistance of a practitioner in her neighbourhood. Lotions, ointments, and poultices were employed, and medicines exhibited, during two months, without any benefit being derived.

She now placed herself under the care of a physician, who enjoined absolute rest in bed, the limb to be kept in the horizontal position, and that emollient applications should be diligently employed.

The sore was occasionally touched with nitrate of silver. This treatment was pursued during six weeks, and was succeeded by the careful application of strapping. The ulcer was by the above described treatment gradually reduced in size, so that at the expiration of three months "it was not larger than a pin's head."

Having kept her bed during three months, finding that her health was suffering materially in consequence of the confinement, and the absence of out-door exercise, and believing that the ulcer was sufficiently healed to permit the employment of the limb, she determined upon taking a little exercise, hoping that it would effect the double purpose of improving her health, and increasing the circulation in the affected limb, which had always been cold, uncomfortable, and almost

incapable of progression. In a few days after she had left her room the ulcer returned to its old state. The work that had demanded and required so much self-denial, loss of time, and scientific appliance during the three previous months — had utterly disappeared. Disappointed, and disheartened, she sought to invigorate her debilitated health by a visit to Ramsgate, where she employed warm sea water bathing, under the advice of the medical gentleman who had recently attended her. She returned to London in unimproved health and in worse spirits—came under the care of various persons, who subjected the sore to "the greasy treatment" in all its varieties, and with all its modifications. The latter treatment did harm—the inflammatory action was increased; and the ulcer having extended considerably beyond its previous dimensions, she again had recourse to medical advice, placing herself during two months under the care of a surgeon of the London Hospital, whose reputation was well established for the cure of such affections. This gentleman employed plaister and bandages with the occasional use of the nitrate of silver.

This treatment was not more successful than the former—a permanent cure was not effected. Miss C. subsequently placed herself under the care of a person residing in the Old Kent-road, who was well-known for the boldness, if not the success, of his practice. During the subsequent period, until she came under my treatment, she had been subjected to a great variety of treatment—chiefly following the prescriptions of various persons who were desirous of rendering her their assistance in the unfortunate situation in which she was placed.

The limb in its whole length, was a good example of the appearances described at page 54—cold and almost insensible to the touch, considerably swollen, it was the subject of elastic œdema—while around the edges of the ulcer, and for a considerable distance beyond it, there were evidences of old standing disease, which had terminated in interstitial thickening of the tissues, constituting œdematous effusion. The condition of the larger ulcer, when it came under my notice, is faithfully delineated in Plate iii., Fig. 3.

It may be defined as a chronic, irritable, extremely painful, and superficial ulceration, situated over the centre of the right tibia, extending in its transverse measurement upwards of three inches. It is of a very irregular, long form, having at its outer extremity a smaller ulcer separated from it by a strip of integument. The larger

ulcer presented a singular and unusual appearance. The edges of the sore were of a blueish, purple-coloured tint; considerably elevated and everted; a copper-coloured stain of a permanent nature surrounded the ulcer and extended for some inches beyond it; there were evidences of long-continued disease of the tegumentary covering, which was thickened and adherent to the tibia above and below the seat of the ulceration.

The floor of the ulcer, more especially on the left side, is formed by the tibia, which is here and there dotted with minute portions of flocculent periosteum. A considerable portion of the exposed bone has been the subject of ulcerative absorption.

Without entering into further detail, I may observe that the above history proves that perhaps a more difficult case could scarcely present itself to the notice of the surgeon.

I have detailed this interesting and highly satisfactory case somewhat fully, because I deem it more valuable than many others on account of the locality of the ulcer, the diseased condition of the bone and its periosteum, the enormous thickening, and interstitial deposition, the œdematous condition of the entire limb, and last, though not least, its decreased temperature. These circumstances, the utter failure of every other remedy, and the highly successful result of the treatment commenced on the 13th of April, 1838, and terminating in permanent cure on the 17th of July following, demonstrate the high value of the remedy. I may add that the case was seen during the progress of the cure, by my friend Dr. E. Johnson.

Miss C. has remained in perfect health up to the publication of this work, and the remains of a once intractable ulcer can scarcely, now, be traced on the surface it once occupied.

Miss H., aged 25 years, of robust constitution, residing in my immediate neighbourhood, had suffered during a considerable period from a painful affection of the legs. The inferior half of the right lower extremity, more especially, was studded with minute ulcerations of a superficial character. She had used a great variety of ointments. The last application ordered was a compound of spermaceti ointment, honey, and sulphate of copper, which produced extreme pain, and did much harm. Under these circumstances, she came under my care. The right leg in its inferior half was covered with minute specks of ulceration, which enveloped both ankles, and extended over the dorsum

of the foot. Particles of subcutaneous cellular tissue were here and there visible. On some portions of the limb were patches of ulceration of about the size of a sixpence, which were covered by an unhealthy purulent exudation. Intermixed with these, were smaller points of ulceration, discharging a thin ichorous fluid, which, produced in great quantity, irritated the parts with which it came in contact.

The limb was much swollen and œdematous, and covered with an inflammatory blush of an erythematous character. Although the rest had been broken, the general health was but little impaired.

The fumigation was commenced on the 13th July, 1838, and on the 29th of that month my patient was cured.

Mr. E. Stirling, dramatic author, had, in consequence of over-exertion and mental excitement, produced considerable general derangement of his health, which ended in a severe form of pemphigus, attacking both legs. The bullæ, when I first saw him, were about the size of a sixpence, and were three in number. Circumstances removed Mr. Stirling from under my treatment, and when I next saw him, a period of some months had elapsed. He was then residing in the Adelphi, unable to leave his room; both legs were covered, more especially over the anterior portions, with ulcerations of a most painful character, which had succeeded to the ruptured bullæ. Other elevations, charged with fluid, were situated, in various directions, in great numbers. These followed the course of the preceding ones, and from time to time burst, and discharged a thin irritating fluid, which produced great pain, and seemed to excoriate those portions of the tegumentary covering with which it came in contact. Mr. Stirling had, during the time when I lost sight of him, been submitted to a great variety of remedies, and had latterly been under the care of an eminent surgeon. He now requested my assistance, which I gave somewhat unwillingly, having informed him previously that I would undertake the cure of his case, which, when it came first under my notice, bore a much more favourable and promising aspect than at my second visit.

A useless and injurious routine of poultices, ointments, lotions, &c., had been diligently followed.

I found him in impaired health, and much depressed in mind. Believing, from my knowledge of the remedy, that it was in my power to relieve his suffering, I reassured him, and commenced the fumigation, which effected a rapid and permanent cure.

INDEX.

The Author regrets to be obliged to issue the Plates uncoloured, the paper on which they have been printed not taking the tints.

Erratum. *Page* 90, *line* 18, *for* "*twenty*," *read* "*sixty*."

Pl. I

Fig. 1

Fig. 2

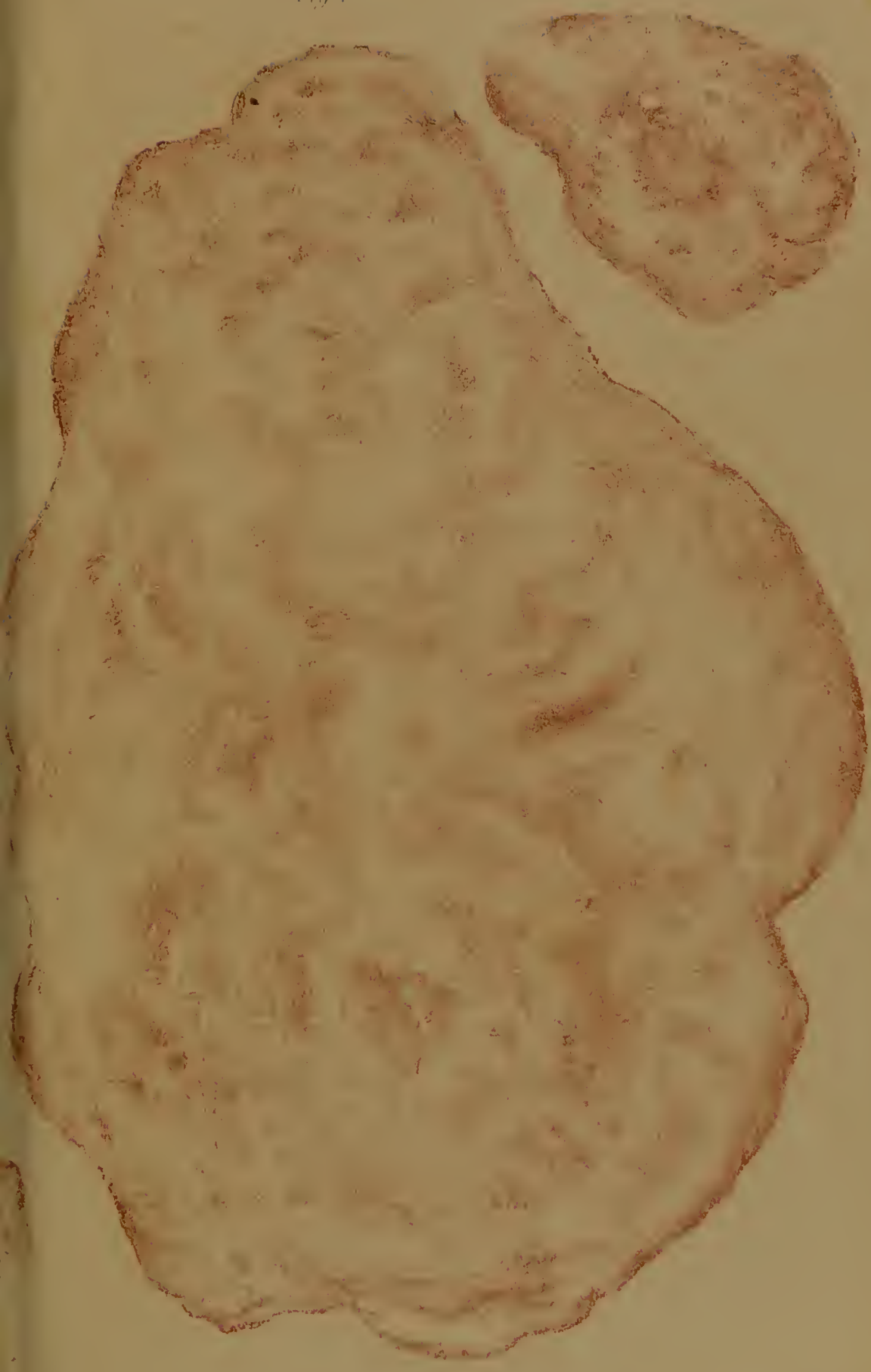


Fig. 1

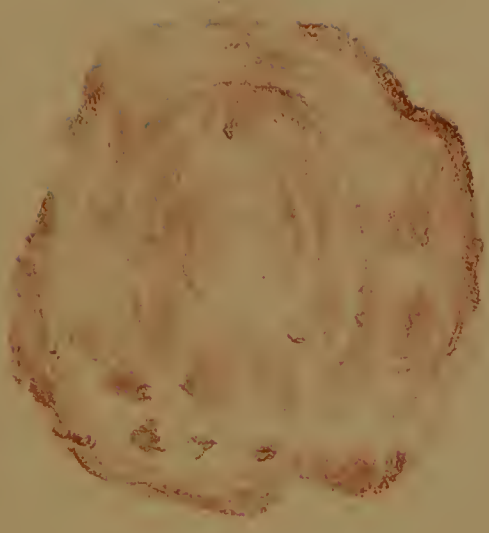


Fig. 2.

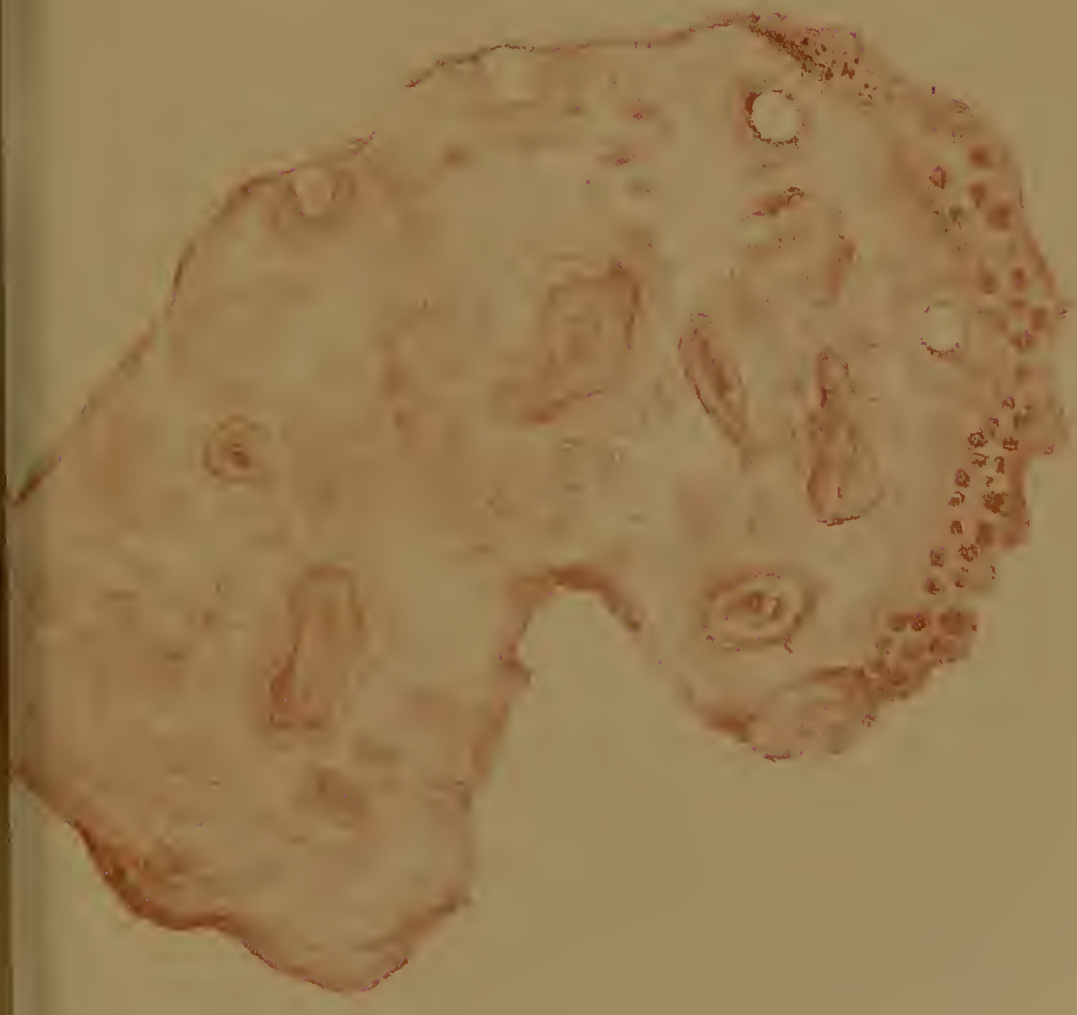
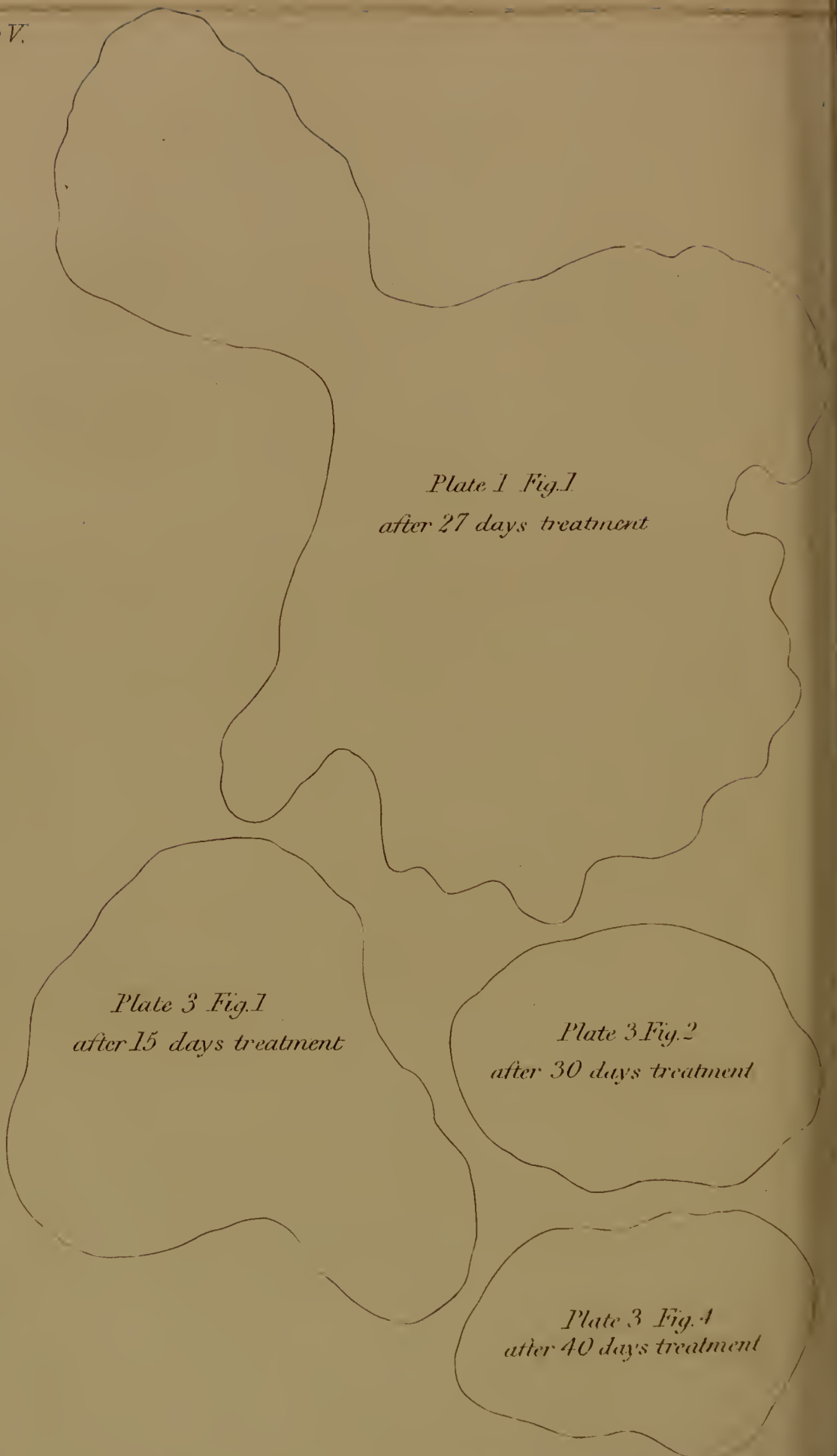


Plate V.



The above simple plan, of illustrating by outlines, taken on Oiled Silk applied over the

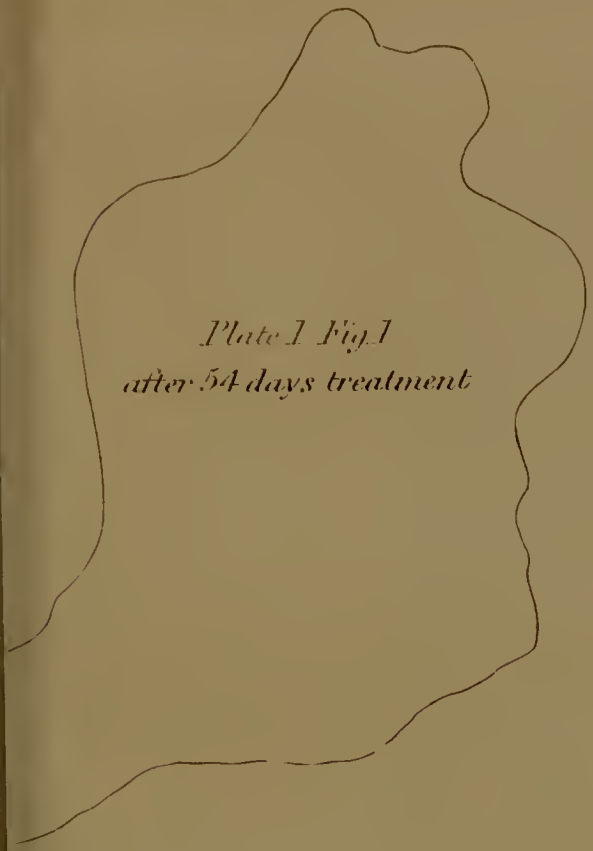


Plate 1 Fig. 1
after 54 days treatment

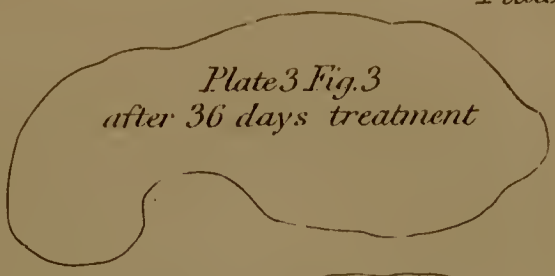


Plate 3 Fig. 3
after 36 days treatment

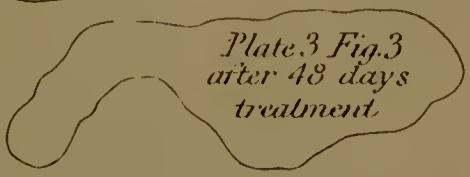


Plate 3 Fig. 3
after 48 days
treatment

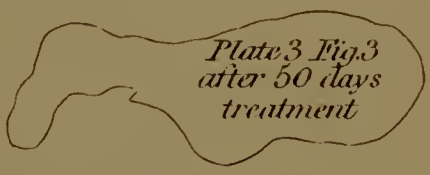


Plate 3 Fig. 3
after 50 days
treatment

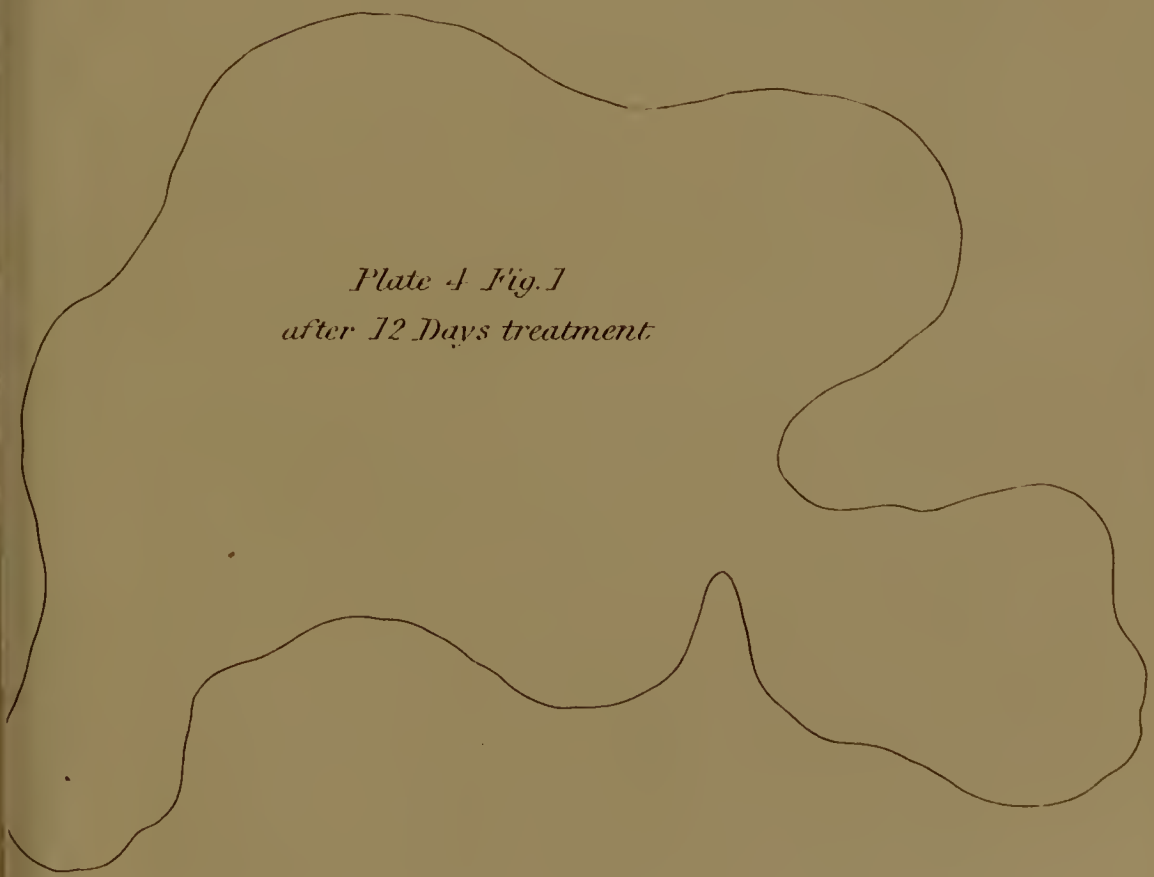


Plate 4 Fig. 1
after 12 Days treatment

Nature of the Ulcer, is novel & will be found useful to practitioners. G. W.